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Student Access to Advanced Placement (AP) Coursework: Principals' Beliefs and Practices

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STUDENT ACCESS TO ADVANCED PLACEMENT® (AP®) COURSEWORK: PRINCIPALS' BELIEFS AND PRACTICES

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ABSTRACT

Advanced Placement® (AP®) courses provide high school students an opportunity to be exposed to the rigors of college while they are still in high school. Since school policies play a role in the opportunities for students to pursue these courses, educational leaders must be aware of the ways in which their personal beliefs and school practices influence the course-taking patterns in their students.

This study investigated the relationship between principals' personal beliefs and perceptions of school practices, and the opportunities for students to successfully complete rigorous Advanced Placement coursework. The study utilized a questionnaire distributed to 88 principals of schools belonging to the Chicago Area Directors of Curriculum and Assessment (CADCA). The questionnaire measured the personal beliefs of the principals and their perceptions of school practices surrounding six constructs:

- Value of AP Coursework and Communicating That Value to Stakeholders
- General Course Offerings
- AP Placement Policies—Open vs. Limited Access
- Attracting More Students to AP Courses
- Teachers' Adaptability and Commitment to AP Expansion
- Expecting and Ensuring Success for Students in AP Courses

The data were analyzed using multiple regression analysis to determine the relationship between principals' responses and the school's AP Equity and Excellence

Score, which measures the percentage of graduating seniors who had a successful AP experience. Research data indicated significant relationships between the AP Equity and Excellence Score and several research constructs. These findings can help school leaders formulate or re-examine policies that allow increasing numbers of students to successfully pursue academically-challenging coursework. By coming to a more complete understanding of the relationship between principals' personal beliefs and student success, this study contributes to the literature about the ways leaders provide opportunities for all students to learn to their full potential.

CHAPTER I

INTRODUCTION

Educators and researchers actively explore measures to evaluate the effectiveness and quality of high schools. A major concern for all educators, and a predictor of future college success, is the level of rigor in students' high school curriculum (ACT, 2005; ACT, 2007; Adelman, 1999; Adelman, 2006; Florida Department of Education, 2005; Matthews, 2005; Matthews, 2008c; Matthews, 2007b; Riley, 2006; U.S. Department of Education, 2000). There are many ways to increase rigor, including revamping curriculum, raising graduation requirements, and providing college-level experiences to students while in high school. A comprehensive Advanced Placement® (AP®) program is one of the most widely-used and analyzed ways to provide students rigorous coursework. As a result, AP programs are often cited when evaluating the quality of American high schools, such as the annual rankings by Newsweek and U.S. News & World Report (Morse, 2007; Newsweek, 2007).

Problem Statement

Since students typically take AP coursework during their junior and senior years, academic placement and course selection in earlier high school years play a role in which students will be ready and able to take AP courses. For years, educators have debated whether students should be tracked into ability groups or left in more heterogeneous groups. On one hand, proponents argue that allowing gifted and talented students to be

grouped with students of similar ability allows them to pursue more challenging curriculum and thought processes, attaining a degree of academic excellence only possible for highly motivated and talented students. On the other hand, sorting simply by grades, IQ tests, or a standardized test closes the door of opportunity to many students, and does not reflect the diversity of the school or society. Further, separating students often leaves some students with unmotivated and undisciplined peers to learn in a culture of lowered expectations.

Brief Review of the Literature

American high schools receive close scrutiny on many fronts, including researchers, international commissions, the U.S. government, and the general public. Several governmental reports and initiatives have examined the current state of public education in the United States, including the "A Nation At Risk" report in the 1980's and the No Child Left Behind Act of 2001. There have been numerous projects focused on improving American public high schools. Standards for Success was a joint project of the Association of American Universities and the Pew Charitable Trusts to determine the knowledge and skills students needed for college success, and to analyze the alignment between state assessments and these standards (Center for Educational Policy Research, 2009). The Bridge Project examined the sometimes-confusing messages students receive when they seek to prepare for college success. The Bridge Project researchers sought to improve college preparation by offering policy guidelines for aligning K-12 curricula, standards, and assessments with college admission requirements (Venezia, Kirst, & Antonio, 2003). The American Diploma Project, an initiative of Achieve, Inc., currently

consists of 34 states dedicated to ensuring high school graduates are prepared for work and college. The project includes aligning high school standards and assessments with college and work requirements, ensuring all students are exposed to rigorous courses, and holding schools accountable for students' success after high school (Achieve and the Education Trust, 2008). These efforts highlight the fact that there is still much work to be done in preparing our students for post-secondary education and the workforce. American high schools are also compared to their international counterparts. One of the most notable reports is the Trends in International Mathematics and Science (TIMMS), which recently indicated that American students are not at the top of the international class of nations, and that there are ongoing performance gaps along racial lines (Gonzales et al., 2008). Addressing these gaps in achievement, both for minority students and for all U.S. high school students, is an issue of equity and justice. Not only do these students stand to benefit from improvements, but the U.S. economy will benefit as well by having a more highly educated and competitive workforce (Wilson, 2004).

Growing numbers of American students are choosing to pursue a college education. There are significant tangible benefits to students who obtain a college education, both in lifetime earnings and career options. Statistics from the U.S. Department of Labor (2008) indicated that earnings are approximately 50% higher for college graduates, and unemployment rates are significantly lower. However, as the number of students attending college rises, only about 50% of these students arrive on campus having completed a core college-preparatory curriculum, meaning not all students are adequately prepared for the challenges they will face in college (ACT and

the Education Trust, 2005; National Center for Education Statistics, 2005). As a result nearly 40% of college freshmen need some form of remedial coursework, leading to frustration and increased tuition costs for students as they obtain the basic skills they should have received in high school (Education Trust, 2008). Knapp, Kelly, and Whitmore (2006) found that since many students are not fully prepared for college, many of them do not complete their bachelor's degree in a timely fashion, with only 35% of students finishing in four years and 56% graduating in six years.

While there are many ideas for improving U.S. high schools, one of the most commonly proposed solutions is to increase the rigor of students' high school coursework (ACT, 2005; ACT, 2007; Adelman, 1999; Adelman, 2006; Barth & Haycock, 2004; Florida Department of Education, 2005; Matthews, 2005; Matthews, 2008c; Matthews, 2007b; National Commission on Excellence in Education 1983; Riley, 2006; U.S. Department of Education, 2000). In one of the most-cited research documents, Adelman (2006) reviewed numerous academic indicators and predictors of college success. His research concluded that the academic intensity of a student's high school curriculum counts more than any other factor in predicting if he or she will be successful in college. ACT (2005) also investigated the factors that prepare students for post-secondary education, and demonstrated strong links between taking upper-level mathematics courses and college success. Other studies have validated the value of rigor, and have explored approaches to increasing rigor and bridging the gap between high school and college expectations (Bottoms, Presson, & Han, 2005; Camara, 2003; Conley, 2007; Florida Department of Education, 2007; Kazis, Vargas, & Hoffman, 2004).

Each of these studies either explicitly states or implicitly assumes that taking more rigorous courses enhances student achievement. Researchers have consistently demonstrated that rigorous coursework is predictive of college success, surpassing GPA, standardized test scores, and class rank. In its report on expanding AP opportunities, the College Board noted that an intense and rigorous high school curriculum is the most important factor leading to a student's likely completion of a college degree (Strategies for Expanding Access, 2002). Further, these courses have been shown to reduce the influence of socioeconomic status on student success.

Rigorous coursework in high school exists in a variety of forms, ranging from college prep courses to college-level courses. Over the past 20 years, high schools have been rapidly increasing opportunities to earn college credit in high school with courses such as Advanced Placement, dual-credit, and International Baccalaureate (IB), with AP courses and dual-credit courses being the most prevalent in the United States (Waits, Setzer, Lewis, & National Center For Education Statistics, 2005). There are many programs throughout the nation specifically targeting expanding options for students to take dual-credit courses through local colleges. Several states, including Iowa, Massachusetts, Minnesota, and Washington, offer programs to make the process easier and more affordable for students (Andrews, 2001; Cech, 2008a; Nathan, 2004; Schworm, 2008).

There are many potential benefits of AP coursework, including higher acceptance rates at more selective universities, strengthening the bridge between high schools and colleges, reducing tuition costs, and shortening the time to college graduation (College

Board, 2008b; College Board, 2008d; Klopfenstein, 2004; Solórzano & Ornelas, 2002; Zarate & Pachon, 2006). AP courses offer numerous advantages over other options for college-level coursework in high school, including the wide range of courses offered and the nationally standardized curriculum.

With the rapid growth of the AP program, a growing body of research has focused on the predictive value of AP coursework to college success, and how AP students compare to students who take introductory college coursework in the college setting. Willingham and Morris (1986) found that AP students were more likely to achieve at high levels in college, and that AP exam grades are very predictive of college success. Other researchers have compared the performance of students who earned college credit with a successful AP exam score to students who took the introductory level course in college. They found the AP students did very well in their upper-level coursework and often took more upper-level offerings (Dodd, Fitzpatrick, DeAyala, & Jennings, 2002; Morgan & Ramist, 1998). Research has also shown that college graduation rates increased among students who succeeded on AP exams (Dougherty, Mellor, & Jian, 2006; Morgan & Klaric, 2007).

Decisions made about tracking students early in their academic careers impact opportunities in later high school years. Numerous studies have examined the issues with student placement in American high schools, including the widespread use of tracking, the ways in which students are placed into courses, and the need for educators to be aware of the effects on students (George & Rubin, 1992; Hallinan, 1994; Jackson, 2008; Lucas, 1999; Oakes, 2005; Oakes, 1995; Oakes & Guiton, 1990; Westchester Institute,

2002). Tracking has been noted to actually help some high-achieving students, but tends to have a negative impact on low-income and minority students, who find themselves in lower-track classes more frequently. Unfortunately, when students are placed into lower-level tracks, they are often constrained to less challenging tasks, causing them to grow more slowly in their academic skills (Ashwill et al., 1999; Lucas, 1999; Lucas & Berends, 2002; Oakes, 2005; Westchester Institute, 2002). Since it is not likely that tracking will go away, it is incumbent on both researchers and practitioners to understand the ways in which students are placed into their courses and the achievement gains that result.

Equity and access for all students should be one of the chief concerns in analyzing how students are placed into various courses. Existing research has investigated the ways students arrive in a particular track, acknowledging the numerous factors involved. Student selection, past grades, standardized tests, and parent requests are all noted to play a role in course placement. Darity, Castellino, Tyson, Cobb, and McMillen (2001) provided evidence that minority students are often underrepresented in more rigorous courses, which is also acknowledged and described in other research (Lucas 1999; Lucas & Berends; Oakes, 2005). Schools serving low-income and minority students consistently offer fewer opportunities for rigorous coursework, and tend to have a reduced emphasis on inquiry and problem solving (Ashwill et al., 1999; Oakes, 2005; Oakes & Guiton, 1995; Oakes, Ormseth, Bell, & Camp, 1990). When interviewing students in schools with large populations of low-income and minority students, students often indicate that they

would like to be challenged and held to higher expectations (Haycock, 2001; Turque, 2008b).

There is no doubt that achievement gaps exist in American education; these gaps have provided the need for mandates such as NCLB. However, additional research must explore ways to provide all students the opportunity to take these challenging courses. Unfortunately, many of the barriers discussed in this literature affect students of all races and backgrounds. Examining schools that have been exceptionally successful in removing barriers will expose beliefs and practices related to more students having the opportunity to succeed.

The College Board, which administers Advanced Placement courses, has an equity policy statement to communicate its desire to expand the AP program to as many students as possible. In its 2002 report on this matter, "Opening Doors: Strategies for Expanding Access to AP," the College Board cited numerous schools successfully removing barriers to students' taking AP coursework. There are several strategies these schools have used, including:

- Eliminating pre-requisite courses
- Providing special study sessions for students
- Recruiting students for AP courses, often targeting underrepresented students
- Aligning curriculum vertically between grade levels
- Providing ongoing professional development for teachers
- Establishing flexible and creative schedules
- Communicating with the community, sometimes using media outlets

Teachers also play a critical role in which students take AP courses, either by recruiting students, encouraging capable students, or, in some schools, providing teacher recommendations. Wilkins (2006) examined differences in teacher perceptions in three constructs: access for all students, high grade requirements in pre-requisite courses, and the necessary degree of instructional differentiation in AP courses. In her research, she surveyed teachers from regular, honors, and AP courses. She concluded that a significant difference existed between the groups of teachers in all three constructs. She noted a continuum of responses, with the regular-level teachers having the most restrictive perception on how students should be given access to AP courses, the need for high grades in pre-requisite courses, and a lower degree of necessary differentiation in AP courses. In each case, the AP teachers more often believed that more students were able to challenge themselves with AP courses, believed in less restrictive entrance requirements, and saw the importance of differentiation in AP courses to meet various student needs. The honors-level teachers fell in between the regular level and AP teachers in each area. This research indicated a range of perceptions among teachers. Those most directly linked to the AP courses saw the opportunities for more students to enroll in these courses. However, the regular level teachers were not as confident in students' ability to tackle the rigorous coursework.

While researchers such as George and Rubin (1992) and Wilkins (2006) have analyzed teacher responses, the current study will measure the perceptions of school principals, who are responsible for establishing school placement policies and the guidance students receive in their course-selection decisions. It is critical to understand

these beliefs and perceptions if educators hope to make improvements in the current systems of student placement and course selection. Further, the current study will specifically connect these perceptions to students' opportunities to pursue and complete a successful AP experience. Wilkins clearly observed a range of perceptions among teachers regarding who is capable of completing AP coursework. Further research should link equity in achievement to school leaders' beliefs and their perceptions about opportunities for students to be placed in rigorous courses. By analyzing the beliefs and perceptions in high schools where students experience much higher rates of AP success, we can better understand how the cultures and practices in schools relate to the percentage of students successfully completing AP coursework.

Purpose of the Study

The purpose of this study is to explore statistical relationships between principals' personal beliefs and perceptions of school practices regarding access to rigorous coursework, and the AP Equity and Excellence Score.

Research Questions

This study will seek to answer the following research questions:

1. What is the relationship between the AP Equity and Excellence Score and principals' personal beliefs in the following research constructs related to AP experience?
2. What is the relationship between the AP Equity and Excellence Score and principals' perceptions of their school's practices in the following research constructs related to AP experience?

- Value of AP Coursework and Communicating That Value to Stakeholders
- General Course Offerings
- AP Placement Policies—Open vs. Limited Access
- Attracting More Students to AP Courses
- Teachers' Adaptability and Commitment to AP Expansion
- Expecting and Ensuring Success for Students in AP Courses

Hypotheses

The following hypotheses will be tested:

1. There is a statistical relationship between principals' personal beliefs in the research constructs and the school's AP Equity and Excellence Score.
2. There is a statistical relationship between principals' perceptions of their schools' practices in the research constructs and the school's AP Equity and Excellence Score.

Definition of Terms

Belief will be used to express the personal conviction of principals about the opportunities schools can and should provide to students. This term will be used to convey the personal value and commitment the principal places on educational ideals related to the six research constructs.

Perception will be used to express the understanding or interpretation of practices currently taking place in the principal's school. A *perception* is the view that the principal has of the school's culture, policies, and practices.

Equity refers to the opportunities extended to all students, giving each student what he or she needs to be as successful as possible, both in his or her current studies and in post-secondary pursuits. Since students enter high school with different background experiences, equity may mean some students receive extra support to catch them up with their peers.

Social justice refers to the institutional patterns and structural preconditions for a person to gain access to various opportunities. Schools routinely categorize and label students based on their perceived academic ability. These labels often dictate which students are enrolled in the most rigorous courses. *Social justice* analyzes these hierarchies, eliminating them when equity is compromised.

Rigorous courses challenge students to learn material in depth and hold high expectations for students. They ask students to read challenging materials and to produce clear, well-constructed writing samples. While there are many ways to define rigorous courses, this study will focus on those that prepare students for college-level coursework, either during or after high school. Further, the degree to which students are able to enroll and succeed in rigorous courses will be measured by the percentage of students receiving scores of 3, 4, or 5 on the AP exam.

Advanced Placement® (AP®) refers to the 37 courses in 22 subject areas and end-of-course exams offered through the College Board and the Educational Testing Service. Since the inception of the AP program in the 1950's, AP courses have given students the opportunity to experience college-level courses and earn college credit while in high school. Currently, over 90% of four-year U.S. colleges and universities grant credit or

placement for qualifying AP scores. In 2008, 1.6 million students at over 17,000 high schools wrote 2.7 million AP exams.

The *AP Equity and Excellence Score* is reported from the College Board to high schools that participate in the AP program. This score expresses the percentage of a school's students who have scored a 3 or higher on an AP exam during their high school career (College Board, 2008a). This score indicates both participation numbers and quality of program, responding to some who express concern about the rapid expansion of AP programs and a potential loss of program quality (Klopfenstein, 2004).

The Chicago Area Directors of Curriculum and Assessment (CADCA) is a group of school leaders from approximately 88 high schools in the Chicago area that routinely meet to share school improvement ideas. These school leaders discuss ideas and findings with the rest of the group, establishing a means by which best practices can be shared. In addition, data are routinely collected for these schools in the suburbs of Chicago.

Research Construct Definitions

The following constructs will be analyzed in this research. These constructs were developed from a review of the literature related to AP coursework and student placement. These constructs were refined and revised during the process of establishing content validity for the research questionnaire. In the subsequent chapters, the related literature will be reviewed, as well as the process used to develop and validate the questionnaire.

Value of AP Coursework and Communicating that Value to Stakeholders addresses the importance of the AP program to a school and how this value is made known to faculty, students, and parents.

General Course Offerings refers to courses other than the AP courses in a school. This includes both rigorous courses that prepare students for the challenges of AP courses, as well as lower-level courses targeted at students who are not believed to be preparing for college.

AP Placement Policies—Open vs. Limited Access examines the degree to which the opportunity to take AP courses is open for all students, regardless of track placement in earlier high school years.

Attracting More Students to AP Courses refers to a school's active recruitment and incentives to bring more students into AP courses, as well as their willingness to accept potential ramifications of this practice, including potentially lower AP scores.

Teachers' Adaptability and Commitment to AP Excellence and Expansion refers to the critical role teachers' play in drawing students into AP courses, varying their instructional approaches to ensure success, and striving to help all students be successful in the AP courses and exams.

Expecting and Ensuring Success for Students in AP Courses addresses the degree to which principals believe students will be successful if they enroll in an AP course. This also considers the measures the school has taken to ensure student success, including professional development for both teachers and administrators.

Delimitations

The delimitations of this study will be as follows:

1. The survey sample will be delimited to principals of large suburban high schools.
2. The responses of the principals will be delimited to responses on questionnaire items surrounding the six research constructs of this study.

Limitations

There will be limitations inherent in the design of this study and to the ability to generalize findings to the entire educational community:

1. The sample size will be limited to the principals that respond to the questionnaire.
2. There will be variability between the tenure of principals' at the various schools, impacting the degree to which they have had an impact on the school's culture and practices related to AP coursework.
3. Although there is diversity in the student populations served by these schools, it does not necessarily represent the diversity found throughout the United States.
4. There are also limitations in comparing between the CADCA schools. The communities served by each school and the student population vary between schools. The demographic and socioeconomic makeup of each school likely has an influence on AP participation rates. Incoming performance levels of

students will also have an impact on the number of students who are pursuing the most rigorous coursework.

5. AP performance is only one of the many ways that school effectiveness can be measured. Therefore, hasty conclusions should not be drawn about the schools participating in the study.
6. The researcher approaches this study with a belief that students should be treated equitably and have equal access to rigorous coursework. This belief could influence the research construct development.
7. The researcher is an employee at one of the schools in the study. However, the researcher is not in a supervisory capacity over the school's AP program or the school's principal. Further, the principal is unfamiliar with the development of the research constructs and the research instrument that will be used in this study.

Framework of the Study

There is no doubt that achievement gaps exist in American education; these gaps have provided the need for mandates such as NCLB. However, additional research must explore ways to provide all students the opportunity to take these challenging courses. Examining schools that have been exceptionally successful in removing barriers will provide the information to ensure that all students are given the opportunity to succeed.

This study is critical in understanding a major component of equity and access for all public high school students. The data will link principals' personal beliefs and perceptions of their school's practices with the AP Equity and Excellence Score.

Although there are demographic differences and incoming student ability differences in the schools, these differences account for only some of the variation in AP success levels. School personnel and policies have considerable control over the participation rates in rigorous courses. This research will quantify these differences and look for patterns that emerge in why some schools provide more students with an opportunity to successfully complete rigorous coursework.

Many schools offer rigorous coursework such as AP programs. The scores on AP exams will remain high if there are stringent selection criteria on who is allowed to take the courses. Although AP programs are the not the only goal of high schools, they are one way to measure the degree to which schools are providing a rigorous academic curriculum, and the extent to which these courses are available to all students. This study will use AP participation as a benchmark to indicate the degree to which schools are inviting all students into the most rigorous courses, and supporting their success in that endeavor.

Administrators set policies for their schools, but these policies must be rooted in research on what works best for students, and the efficacy and equity of the policies. This research will allow a closer look at the personal beliefs and perceptions of school practices that exist among principals. By providing an analysis of the personal beliefs and perceptions of principals regarding student placement and AP participation, leaders can formulate or re-examine policies that will ensure success for each and every student.

A framework of equity and social justice demands that schools investigate options to maximize learning for all students. If educators truly believe all students can learn,

they must explore ways to allow them to stretch and grow to their fullest potential, and identify any attitudes or practices that block opportunities. Providing students with a path to taking AP courses also gives students a chance to receive college credit without paying college tuition, a significant value for students from lower socioeconomic backgrounds.

Summary

This chapter presented an introduction for the current study, including the research questions and hypotheses. Definitions for research terms and constructs were presented, and will be developed more fully in Chapter II. A brief review of the literature and framework for the study outlined the state of high schools in the United States, the various approaches to placing students into academic courses, and the degree to which students are challenged and expected to excel. Educators' beliefs and practices will, in large part, determine the opportunities students have to move into AP coursework. In the following chapter, the related literature will be explored more fully, including analyzing schools that have effectively removed barriers to students' accessing the most rigorous coursework and seeing the lessons we can learn from them. This exploration will present the context for the current study, and the need to explore the role principals play in providing leadership for their schools.

CHAPTER II

REVIEW OF LITERATURE

Current State of US High Schools

Dating back to the late 19th century, Americans have scrutinized public high schools, calling for changes in how we educate our children. During this period, there have been various measures to raise standards and increase rigor, stemming from events such as Sputnik in the 1950's, the "A Nation at Risk" Report in the 1980's, the No Child Left Behind Act of 2001, and the National Summit on High Schools in 2005. Recently, there have been organizations advocating for higher standards in our high schools, including the American Diploma Project (ADP), The Bridge Project, Standards for Success, and the New Commission on the Skills of the American Workplace. These recent studies indicate that, in many cases, students leave high school without the ability to tackle the challenges of college-level coursework or the workplace. As a result, many students find themselves in remedial college coursework or passed over for well-paying jobs.

International comparisons such as the Trends in International Mathematics and Science (TIMSS) periodically compare the achievement of students in the United States with countries throughout the world. In the 2007 administration of TIMSS, the fourth since 1995, 36 countries participated in grade four and 48 countries participated in grade eight. American students showed improvements in 2007 compared to 1995 in both math

and science, especially among the lowest-performing students. Although American students scored higher than the international average in both math and science, several countries consistently scored higher. Data comparing American students to each other demonstrated the ongoing achievement gap along racial lines, with white and Asian-American students scoring higher than black and Hispanic students (Gonzales et al., 2008).

In a joint initiative between the Center for American Progress and the Institute for America's Future, a national task force conducted a year-long investigation into strategies for improving American education. The goal of the task force was to make specific recommendations for providing American students the best possible education. As in the TIMSS study, their report noted two achievement gaps that needed to be addressed: a gap among American students based on variables such as race, income, and language, and a gap between American students and those of other industrialized nations. The task force provided several recommendations, including two directly related to the coursework students should take in high school. First, schools should prepare all students for the challenges of post-secondary education, whether that be college or vocational training, by ensuring all students complete rigorous coursework in high school. Second, schools must bridge the gap to college by providing students earlier exposure to college coursework (Brown et al., 2005).

A report by the Commission on Access, Admissions and Success in Higher Education (2008) sought to provide a wake-up call to the American public about the United States' slipping position in global educational comparisons. While other nations

have increased educational opportunities and experiences for their students, the United States has remained stagnant. This report highlighted the effect this has had on our relative standing with other nations. During the 20th century, the United States was near the top of the list in high school completion rates, but by 2005 had slipped to 21st out of 27 of the world's more advanced countries. Similar trends were seen in the college graduation rate in the United States. When considering college completion among 55-64 year-olds, the United States ranked 2nd in the world. However, 25-34 year-old Americans ranked 11th out of the same 33 nations. While the college completion rate has stayed near 37% for Americans, many other nations have quickly passed us by. Gaston Caperton, President of the College Board, noted the need for the United States to regain a stronger focus on education: "A compulsion to excel elsewhere in the world has transformed education globally; it is time we developed the same compulsion" (Commission on Access, 2008, p. 3). This study pointed to a leak of students in the educational pipeline, with most of the losses occurring after students enter high school. It also highlighted the changing demographics in our nation, with an aging, well-educated white population being replaced by a population of less-educated minority citizens. Only 26% of African Americans, 18% of Latinos, and 24% of Native Americans/Pacific Islanders have completed at least an associates' degree.

The discussion and motivation for expanding educational access normally revolves around a pursuit of equity for all learners. Wilson (2004) contended that, while this is a noble and necessary focus, we need to consider how educational equity and expanded access benefit the public good. She noted that at the start of the 20th century,

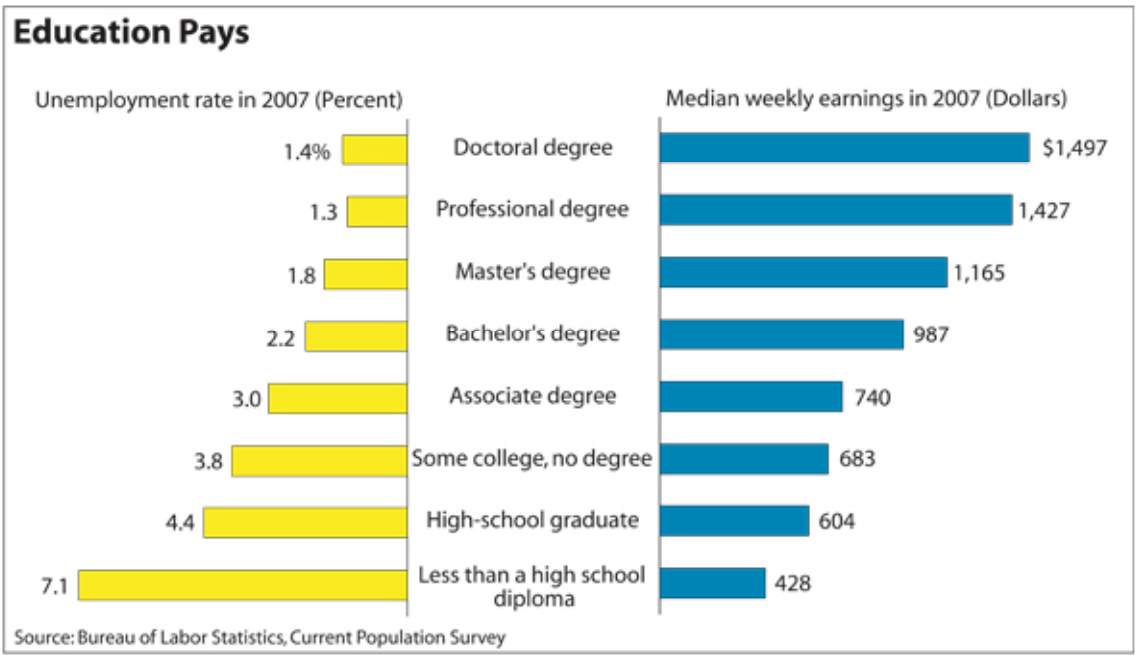
only 6% of Americans graduated from high school, a number that has now grown to 85%. In the past century, many national educational initiatives have been in response to the needs of our society and the national defense, such as the GI Bill of Rights following World War II, or creating the National Science Foundation and passing the National Defense Education Act during the Cold War. If we are to improve our nation's slipping position in the global educational ratings, we must see expanding opportunities for all learners as both an issue of equity for individuals and a necessity for the public good (Wilson, 2004). To that end, the Commission on Access, Admissions and Success in Higher Education (2008) has called for a goal that by 2025, 55% of American students complete their schooling with at least a community college degree. Although this is a jump from our current level of approximately 37%, this can be attained with a one percentage point increase per year in the number of college graduates.

The Value of College Education and Beliefs About Who Should Attend

> It is a curious fact that we Americans habitually underestimate the capacity of pupils at almost every stage of education from the primary school through the university…It seems to me probable that the proportion of grammar school children incapable of pursuing geometry, algebra, and a foreign language would turn out to be much smaller than we now imagine (Eliot, 1969, pp. 260-261).
>
> Charles Eliot, 1892
> President, Harvard University

Unfortunately, some Americans believe that, while all students from Japan, Germany, or Russia can learn, not all American students can. Others believe that even if we could educate all students for college, maybe we shouldn't. Their reasoning includes the idea that, if we send all of our students to college, there will not be anyone to fill blue-collar jobs such as plumbers, carpenters, and auto mechanics. In his book, Murray

(2008) argued that many students are not capable of the rigors of college, and should be relegated to taking a less demanding course load, focusing on training for the workforce.



U.S. Department of Labor, 2008 http://www.bls.gov/emp/emptab7.htm

Figure 1. Comparison of Employment and Earnings Based on Educational Attainment

However, researchers have increasingly found that these jobs require the knowledge and skills of college preparatory coursework versus the basic skills taught in many vocational education courses. Researchers such as Rose and Betts (2001) have commented on a strong link between college admission requirements and job readiness requirements, noting strong academic skills will serve students well regardless of the career path they take. There is a great income divide for those succeeding in post-secondary education, with the gap widening with more education. The benefits to individuals who continue in school are substantial, with median weekly earnings for a college graduate of $987 compared to $604 for a high-school graduate. In addition,

unemployment rates are 2.2% versus 4.4% for the same groups, respectively (U.S. Department of Labor, 2008). Should we knowingly keep some students uneducated and unskilled to prevent wage deflation for the more educated? Likely, those who believe college isn't for everyone are referring to "other" people's children, believing their own children should attend college (Barth, 2003).

Gap Between What High School Students Learn and What Colleges Expect

When high schools send their students to college, they expect them to be successful. However, as record numbers of students' transition to college, it is apparent that many of them are not prepared for success. In 2004, nearly three in four U.S. high school graduates enrolled in a four-year college, yet only 56% of those graduates had completed a core college-preparatory curriculum in high school, rendering many under-prepared for the challenges of post-secondary education (ACT and The Education Trust, 2005; National Center for Education Statistics, 2005). Although many of these matriculating students were ready for the challenges of more independent learning, higher-level thinking, and the faster pace of instruction, it is clear that many were not. According to recent statistics, only 35% of the students in four-year institutions receive a bachelor's degree in four years, and only 56% graduate within six years (Knapp, Kelly, & Whitmore, 2006).

In a compilation of 26 essays from various authors, Kazis, Vargas, and Hoffman (2004) provided numerous options to significantly expand post-secondary success, and to reduce the achievement gaps based on household income and race. Although the contributors to this work did not agree on every point on how to achieve these goals, they

did agree that it's no longer enough for students to just finish high school or to attend college. Rather, to gain a true foothold as they step into the workforce, students must successfully complete college and learn the necessary skills to compete in the current economy.

High school teachers strive to prepare students for challenges they will face in the future, including college coursework. However, Sanoff (2006) found that what teachers perceive as adequate preparation does not always match the expectations of college professors. In two questionnaires, one sent to high school teachers and one to college professors, there were significant differences in the assessment of students' preparation. For example, while 36% of the teachers thought students were well prepared in writing, only 6% of professors felt incoming students were well prepared to write. Because of the increased expectations for quality writing, this is a troubling gap. In addition, 37% of the teachers believed students were well prepared in math, compared to only 4% of the professors. The professors also noted students' poor study habits, trouble tackling difficult material, and low motivation to learn and apply information. In the study, both teachers and professors agreed that there should be more communication and articulation between secondary and post-secondary educators.

In a joint report from two of the nation's strongest voices for high standards, Achieve, Inc. and the Education Trust (2008) reported on the progress states have made in preparing students for college and the world of work. In this report, states were called upon to align learning standards to the demands of work and college. To date, 28 states have worked with Achieve, Inc. to verify alignment of their high school standards with

the knowledge and skills required by colleges and employers. The report recommended that all students should be exposed to a rigorous curriculum, and teachers must be trained and monitored to ensure students are consistently held to the same high standards. High school assessments need to be carefully constructed to ensure students passing the tests are indeed prepared for college or work. Assessment results need to be communicated clearly to educators to empower them to effectively monitor current student performance and to provide incentives that reward progress. The report listed numerous questions schools and states should be asking, including the degree to which students are afforded the opportunity to earn college credit while in high school. This credit can be earned in AP courses, or in the various dual-credit options available throughout the country, bridging the gap between high school and college success.

One of the challenges with the United States' system of local control of public schools is our lack of a single organization to oversee the system from kindergarten through postsecondary education. Some leaders have called for a K-16 system that addresses the disconnect between high school graduation requirements and college admission standards, providing a seamless transition into college. This would certainly address the challenges brought on by freshman students who increasingly need remedial coursework (Boswell, 2000). Although a comprehensive K-16 system is not likely to occur in the near future, students and parents need to be more aware of the academic skills necessary for successful transition into college, and all students should be held to higher academic standards.

Getting Students Ready: Rigorous Coursework as a Predictor of Success

Numerous studies either explicitly state or implicitly assume that taking more rigorous courses enhances student achievement. Researchers have consistently demonstrated that rigorous coursework is predictive of college success, surpassing GPA, standardized test scores, and class rank. In its report on expanding AP opportunities, the College Board noted that an intense and rigorous high school curriculum is the most important factor leading to a student's likely completion of a college degree (Strategies for Expanding Access, 2002). Further, these courses have been shown to reduce the influence of socioeconomic status on student success.

College-readiness is one of the most important roles a high school plays. Students who are ready for college are more likely to enroll in college, less likely to need remedial courses when they arrive on campus, and more likely to attain a college degree. In 1983 the federal government released *A Nation at Risk*, outlining the state of education in the United States. One of the proposals in the report included the need for students to be exposed to a rigorous, college-preparatory core curriculum (National Commission on Excellence in Education, 1983). In assessing the current rigor of high school curriculum and progress over the past 25 years, ACT (2007) noted several patterns based on the courses students completed in high school. Of particular interest was the impact of taking a core curriculum of rigorous college preparatory courses, and how that correlated to students' meeting ACT's college readiness benchmarks. More recently, numerous researchers and reports have called for increasing rigor in high school coursework for all students, raising graduation requirements, and aligning high school content standards to

the skills needed to thrive in the workforce and higher education (ACT, 2005; ACT, 2007; Adelman, 1999; Adelman, 2006; Commission on Access, 2008; Florida Department of Education, 2005; Matthews, 2005; Matthews, 2008c; Matthews, 2007b; Riley, 2006; U.S. Department of Education, 2000).

According to the National Center for Education Statistics (2008), over 15 million American students planned to enroll in postsecondary education in 2007. While record numbers of students are attending college, approximately 40% of them arrive needing some form of remedial coursework, with many ultimately not completing their degree (Education Trust, 2008). In a report reviewing high school courses, ACT (2005) noted that some coursework sequences better prepare students for college success. The primary recommendations were to continually improve the rigor of coursework, to expose more students to a rigorous college-preparatory sequence, to focus on subject knowledge depth, and to align the expectations with postsecondary education.

ACT's analysis indicated that 75% of the students who simply took the core curriculum were not prepared for college. Students who took more than the minimum core curriculum were more prepared for the challenges of college, but even when students took many additional courses, large numbers of them did not meet ACT's college readiness benchmarks. It also indicated strong links between taking upper-level mathematics courses and succeeding in biology and beyond, and taking upper-level science courses and succeeding in Algebra and beyond. Further, this study indicated that when monitoring students' progress throughout their high school years, there were actually less students meeting the benchmarks than in the early high school years. This is

an indication that many students were losing momentum in their later high school years. The ACT recommended that high schools and postsecondary institutions align their standards and increase the rigor of coursework, which is exactly what AP courses do. The standards for AP courses are aligned and matched with the expectations of college coursework, and are among the most rigorous courses available to high school students. Although this report did not analyze whether stronger students simply take more rigorous courses, it indicated that students who successfully complete rigorous courses are better prepared for college success.

In a replication effort of his earlier study (Adelman, 1999), Adelman (2006) followed a nationally representative group of students from high school to degree completion. This study attempted to determine the most critical determinants in whether a student who enrolled in a four-year college attained a bachelor's degree. Although this follow-up study was separated from the original study by nearly ten years and several education policy initiatives such as NCLB, they agreed on many findings, including the value of rigorous coursework for students.

While many of the keys to attaining a bachelor's degree come into play once a student enrolls in college, Adelman (2006) emphasized that it all begins in high school (and before). In his report, Adelman provided 31 gradations of academic intensity and examined which factors were most predictive of a successful college experience. The academic intensity of the high school curriculum was cited as counting more than any other factor in beginning a student on the road to degree completion. He demonstrated that when students completed a high school curriculum with the highest levels of

academic intensity, 95% of them earned a bachelor's degree. Unfortunately, not all schools provide students with the same curricular opportunities to learn. In addition, certain ethnic subgroups, such as Latino students, were more likely to attend schools that excluded them from these opportunities. In the end, Adelman highlighted five important factors for degree completion, many of which dealt with students' enrollment patterns and schools' policies on scheduling and withdrawing. However, Adelman again noted that participating fully in a high school academic curriculum was the most important variable for a student:

> Indeed, the first year of postsecondary education has to begin in high school, if not by AP then by the growing dual enrollment movement…If all traditional-age students entered college or community college with a minimum of 6 credits of "real stuff," not fluff, their adaptation in the critical first year will not be short-circuited by either poor placement or credit overload (Adelman, 2006, p. 108).

While Adelman's (2006) work is widely respected and often referred to in the literature, the implications need to be communicated to schools, practitioners, and students' families. Although researchers and policymakers need to be aware of the findings, the quickest changes will take place when individual schools and individual students understand what will contribute to their future success.

To combat issues with high school graduates' not being prepared for college-level work, Conley (2007) suggested several steps high schools can take. First, he suggested aligning high school curriculum more closely with college expectations. Several groups have developed standards for what high school students should know and be able to do to be successful in college. These include the Standards for Success Project, The American Diploma Project, and Washington State's Transition Math Project. High schools can use

these tools to compare their curriculum to college expectations, as well as charting the progression in student growth through high school. Additional recommendations, such as adding missing content to high school courses, reviewing high school course syllabi, and implementing senior seminar experiences are geared at ensuring students experience a rigorous curriculum, readying them for the challenges of college. A recent summit of Texas educators agreed that students' passing state exams did not guarantee that students were ready for college. Although not deciding on one surefire way to ensure students were ready, increasing the rigor of students' high school experience, no matter the academic "track" they are in, was one common theme that continually emerged (Mellon, 2008).

Linking High School Rigor and College Success

Analyzing the link between high school rigor and college success, the Florida Department of Education (2005) noted that postsecondary success begins with high school preparation. This study considered students' level of high school math and reading courses, scores on the Florida Comprehensive Assessment Test, scores on the Common Placement Test, and successful outcomes in college. Although this study did not control for students' ability or test scores as they entered high school, it did support the findings of other researchers linking rigor in high school to success in college. In all cases, the data indicated that students who took higher-level math and reading courses in high school achieved several positive outcomes, ultimately leading to more success in college than students who took less rigorous high school courses. In addition, this study cited work being done by the Florida Department of Education's Office of Equity and Access,

in which nine high schools have piloted a program with the College Board and the Department of Education to increase rigor in high school programs.

Bottoms, Presson, and Han (2005) studied 12 high-performing rural schools in southern states. Their goal was to highlight the educational practices more frequently found in these schools and to understand how these schools did better than a matched set of low-performing schools with similar demographics. Each of the 12 high-performing schools had higher percentages of minority and/or impoverished students, but showed impressive student achievement differences. Among the significant differences, more students in high-performing schools completed a rigorous academic curriculum, with 11 of the 12 schools having set higher graduation requirements than the state. In addition, students in these schools more frequently reported teachers having higher expectations for students to do high quality work, and providing support for students who challenged themselves but still had difficulty learning. This research confirmed earlier research by the same authors, in which they noted the connection between high standards for all students and outstanding student achievement (Bottoms, Han, & Presson, 2002).

In a review of educational statistics, Camara (2003) noted that students taking a rigorous core curriculum in high school and obtaining at least one AP qualifying score (3, 4, or 5) were much more likely to remain on track for a bachelor's degree. Students successfully taking two or more AP exams were even more likely to obtain a bachelor's degree than other students. Further, participating in rigorous coursework reduced the likelihood that a student needed remedial coursework in college, and mitigated the challenges of being a first-generation college student on degree attainment.

Options for Advanced Study in High School (AP, IB, Dual-Credit Courses)

Schools across the nation continue to explore options for exposing more students to academic rigor in high school. In addition to ensuring more students are taking a college-prep course sequence, many schools and states are increasing the options for college-level coursework while still in high school. Over the past 20 years, high schools have been rapidly increasing opportunities to earn college credit in high school with courses such as AP, dual-credit, and International Baccalaureate (IB), with AP courses and dual-credit courses being the most prevalent in the United States (Waits, Setzer, Lewis, & National Center For Education Statistics, 2005).

In 2002-2003, The National Center for Education Statistics conducted a survey to analyze the prevalence of dual-credit and exam-based courses. This study found that these courses were most commonly offered in large suburban high schools (defined as more than 1200 students), with 97% of these schools offering AP courses and 82% offering dual-credit courses. Only 13% of public high schools nationwide offered no dual-credit, AP, or IB courses. Although not directly addressing prerequisites for AP coursework, this survey did address the entrance requirements for dual-credit courses, including grade level (84% of schools), minimum GPA (48% of schools), teacher recommendation (42% of schools), and standardized test scores (31% of schools). This study highlighted the extent to which college-level learning was taking place in high schools, specifically how and where this learning takes place (Waits, Setzer, Lewis, & National Center for Education Statistics, 2005).

Dual-credit courses are one way many high schools and colleges have partnered to provide students rigorous curriculum and earn college credits at the same time. In his book on dual-credit courses, Andrews (2001) made the case for these courses and provided successful examples of states nationwide that have provided a financial and academic advantage to students wishing to complete a college degree. The opportunity to take college courses while in high school is especially motivating for seniors who may see their senior year as coasting before they get to college, since many of them have completed the required courses for graduation and college admission. This same motivation occurs in AP coursework, since satisfactory performance on the AP exam earns college credit and may exempt the student from taking a required course in college. Like AP courses, dual-credit offerings can improve student motivation, provide a way for low-income students to earn college credit at a nominal cost, and enhance students' self-esteem as they tackle rigorous coursework in a supportive high school environment.

Iowa Governor Chet Culver proposed "Senior Year Plus" as a way to increase students' ability to complete college coursework while still in high school. Under his plan, students could take up to 30 hours of college credit. Some members of the higher education community expressed concern, noting that some students may not be prepared to tackle the rigors of college coursework while still in high school, and questioning whether a course taught by high school teachers was up to college-level rigor (Cech, 2008a). Other states have followed similar paths. Thanks to a $2 million commitment from state lawmakers in Massachusetts, hundreds of high school students have taken

advantage of increased dual-enrollment course opportunities, giving them a jump start on both college study skills and college credit (Schworm, 2008).

Building on his work with numerous school districts and state legislatures, Nathan (2004) recommended several steps school districts could take to improve high school students' success, while bolstering their chances of transitioning into college coursework. He noted the fiscal realities for schools, and offered ideas and examples for state funding that promote these course options. He cited the successful dual-enrollment programs Post-Secondary Options in Minnesota, and Running Start in Washington. He explained the established funding mechanism, in which state funding follows individual students based on the proportion of their courses at the high school or the local college. As also noted by Vargas (2004), this funding model can strain the high school's finances as money leaves the school, following the student to the college offering the dual-enrollment course. States have responded to this by expanding their AP program offerings. The response to this formula in Minnesota High Schools was to promote AP coursework within the high schools, with AP enrollment growth in Minnesota more than doubling the national average during a 15-year period. Vargas noted similar AP expansion efforts in Washington. The result is more students benefiting from affordable options to complete rigorous, college-level coursework while in high school.

Advanced Courses and Gifted Students

Hertberg-Davis, Callahan, and Kyburg (2006) conducted a grounded theory study in 23 schools offering AP courses, International Baccalaureate (IB) programs, and both AP courses and IB in the same school. Their goal was to investigate the instructional

approach of the teachers, and the perceptions of the gifted students who had taken the courses. The study was directed at finding if AP courses and IB programs are a good way to meet the unique needs of gifted students, since this is the primary means by which high schools differentiate coursework for their gifted students. In their analysis of teachers' approach and belief about instruction, most AP and IB teachers were guided by the end-of-course exams. They felt compelled to cover a certain body of material in a relatively short period of time, which was often done through lecturing. In addition, the teachers generally felt their classes were (or should be) a homogeneous group of students. Adjustments in instruction were made with the entire class in mind, with help for struggling learners coming after the school day. The general level of understanding among the students dictated the pace of the course. Based on the teachers' concept of the one-size-fits all curriculum, this could pose difficulties for some learners, especially gifted students or students who may be challenging themselves to step up and take these rigorous courses. This study highlighted the need for teachers to be trained in differentiating instruction if increasing diversity in these rigorous courses is a priority. Students felt a general sense of satisfaction, appreciating the fact that they had been challenged in the courses and feeling that the extra work would be rewarded in college admission decisions.

VanTassel-Baska (2000) touted the merits of AP coursework for gifted students. She noted that the AP program sets high level expectations for all students, but is a unique tool in meeting the learning needs of gifted students, providing motivation, preventing mental laziness, and presenting an opportunity to reduce the cost and time of

completing a college degree. In their comprehensive report on the acceleration of gifted students, Colangelo, Assouline, and Gross (2004) called AP the best large-scale option for gifted students who preferred to stay in high school with their peers, finding that challenging coursework in high school stimulated gifted students to stay engaged in their coursework and to achieve at high levels.

Focusing on AP as an Option for More Students

While there are a variety of ways to measure the rigor of a high school curriculum or the degree to which coursework is college prep, accelerated, or advanced, the current study will choose to use schools' AP participation rates as the benchmark for student access to rigorous coursework. AP courses are the most widely-used college-level learning in high school, and can be offered in a variety of formats. The Advanced Placement program is administered and offered through the College Board. Since the inception of the AP program in the 1950's, AP courses have given students the opportunity to experience college-level courses and earn college credit while in high school. The AP program currently includes 37 different subjects, each with a rigorous end-of-course exam. Currently, over 90% of four-year U.S. colleges and universities grant credit or placement for qualifying AP scores. In 2008, 1.6 million students at over 17,000 high schools wrote 2.7 million AP exams. Participating in the AP program affords students several benefits, including intellectually-stimulating curriculum, earning college credit while still in high school, higher grade point averages due to grade point weighting, favorable review by college admissions offices, and a national scale for comparing student achievement (College Board, 2008b; College Board, 2008d; Klopfenstein, 2004;

Solórzano & Ornelas, 2002; Zarate & Pachon, 2006). Many colleges and universities award college credit for students scoring 3, 4, or 5 on these exams. AP courses offer numerous advantages over other options for college-level coursework in high school, including the range of courses offered and the nationally standardized curriculum.

Jay Matthews has been one of the strongest proponents of raising high school standards and providing AP coursework to more students. He has written extensively on the topic, touting the benefits of teaching a rigorous standardized curriculum to high school students, and having an outside panel of educators grade the students' exams. In highlighting schools' AP programs, he has noted AP course benefits, and agrees with some educators who believe that AP courses are often better than the corresponding college course due to smaller classes, experienced teachers, and motivated students (Matthews, 2005).

The Role of AP Participation and/or Scores in College Entrance Decisions

Colleges consider many factors when reviewing applications for enrollment. Included in the list of criteria is the rigor of a student's high school coursework, with AP courses often given special consideration or weighting. Klopfenstein (2004) noted that the University of California ranks the number of AP courses and student performance in them as the fourth criterion in student admission. Since AP exam scores and end of course grades are often not available at the time admissions decisions are being made, some colleges give special consideration to students for simply being enrolled in AP courses. Geiser and Santelices (2004) warned against the practice of giving special consideration for simply taking an AP course. In a study of 81,445 freshmen entering the

University of California campuses between 1998 and 2001, they found that merely taking AP courses had little predictive value for college success. However, they noted that scores on the AP test were among the best predictors of student success. This is an important note, since many students enrolled in AP courses do not take the AP exam in the spring. Further, Geiser and Santelices noted the potential inequity if AP participation is used for admissions decisions, since minorities and disadvantaged students are underrepresented in these courses.

Johnstone and Del Genio (2001) used survey data from 451 colleges and universities to examine policies and perspectives on AP and dual-credit courses. They found varying impressions of college-level learning in high school (CLLHS), with more selective institutions placing less value on AP and dual-credit coursework. With the significant and dramatic increase in CLLHS, universities continue to review policies and practices. While some of the universities' concerns could stem from a desire to preserve their enrollment and tuition revenues, the dialogue must continue about the value CLLHS brings to high school students, parents, taxpayers, and colleges. Also, with increasing numbers of students engaged in CLLHS, educators must continue to review policies that impact access to these courses so access and achievement gaps do not widen any further.

Performance of AP Students in College

> 40 percent of students entering four-year colleges and universities require some remedial education. By exposing students to Advanced Placement coursework, we can ensure that every child leaves high school ready to tackle the challenges of higher education. By raising standards and expectations, our students will learn more, become better prepared for college and the workplace, and expand their intellectual horizons (Spellings, 2005).
>
> Margaret Spellings, Former U.S. Secretary of Education

In a literature review dealing with the various aspects of AP coursework, Santoli (2002) considered evidence supporting the value of AP courses for college admission, attendance, and success, including the economic benefits to students. In addition to the benefits of AP courses for many stakeholders, she highlighted potential challenges in offering AP coursework, including maintaining equity for students, finding highly qualified teachers, and funding the program.

With the rapid growth of the AP program, a growing body of research has focused on the predictive value of AP coursework to college success, and how AP students compare to students who take introductory college coursework in the college setting. In a comprehensive longitudinal examination of over 4,800 students across nine campuses, Willingham and Morris (1986) provided extensive data and analysis for AP students' success in college. They found AP students to be superior in all 19 pre-admission measures of student achievement when compared to non-AP students. When analyzing the performance of the AP students in college, this study controlled for background characteristics of the AP students, matching them to comparable non-AP students. Overall, this research found AP students to be more likely to specialize in more demanding majors, graduate with a double major, stay in school, maintain academic performance commensurate with their pre-admission abilities, and exhibit success in areas such as leadership and significant accomplishments. Further, they found AP exam scores to be predictive of college success, with students receiving higher AP exam scores performing markedly better than other students.

Reviewing the growth of the AP program, Lichten (2000) challenged the legitimacy of the College Board's grading scale, which indicates that an AP exam score of three, four, or five implies a student is "qualified," "well qualified," or "extremely well qualified," respectively. Lichten compared this scale to the policies of highly selective, selective, and non-selective colleges in accepting AP scores for college credit in introductory college coursework. He proposed that a more accurate indication of colleges' acceptance of AP scores would indicate that scores of three, four, and five would more accurately represent "possibly qualified," qualified," and "well qualified." Scores of one or two would indicate "no recommendation" for placement purposes. His assertion is that AP could be more of a "placement" into introductory courses than an "advanced placement" into upper-level courses.

Camara, Dorans, Morgan, and Myford (2000) provided a direct response to Lichten (2000), outlining the value of the AP program to students and the universities they will attend. While Lichten challenged the integrity of the AP program with its burgeoning enrollment, Camara et al. countered with an explanation of the expansion of AP coursework to previously underrepresented students. First, having more students enrolled in AP courses increased the diversity of students represented. Whereas previous AP students may have been more likely to come from families with stronger educational backgrounds, the expanding AP program is including students with more diverse backgrounds. Second, there are external initiatives, such as states' paying for all AP students to take the exam, that have led to more students' taking the exam who may not have in the past. While both of these realities may result in an initial drop in AP scores, it

does not necessarily indicate a drop in program quality. The goal of AP is not to be an elitist program that serves the needs of the few, but rather to serve as a springboard for the masses by exposing them to rigorous, college-level coursework in high school. Finally, Camara et al. pointed out that the College Board's role is not to dictate which colleges grant credit for which AP score. AP grading scales are set based on validity checks in which AP exams are given to college students under "motivated conditions" in the comparable college class.

In one of the most comprehensive and often-cited studies of AP students' success in college, Morgan and Ramist (1998) studied students' grades in upper level calculus, physics, and chemistry classes. They compared the grades of students who placed into the upper-level class based on their AP scores with students who took the introductory course while in college. They elicited the cooperation of the 70 colleges and universities receiving the most AP grades. Twenty of these schools agreed to supply data for the study, and one small liberal arts college was included in the study. The data indicated that students who placed in upper level math and science courses based on earning AP scores of 3, 4, or 5 were extremely successful in their upper-level courses, and compared very favorably to students who took the introductory course in college. The authors noted the measures taken by the College Board to ensure the validity of AP exam scores, such as the periodical curriculum surveys sent to colleges and universities, the administration of the AP exams to students completing the introductory college course, and the achievement of the AP students in upper-level coursework. This final indicator is the ultimate "measuring stick" in determining if students successfully completing the AP

exam were prepared for subsequent coursework. While Lichten (2000) looked only at the willingness of colleges and universities to accept the grade, the work of Morgan and Ramist indicated the success of students who had received college credit for their AP exam scores.

Matching Students to Evaluate the Predictive Value of AP Courses

In assessing the predictive value of AP courses on future success in college, it is important to consider the nature of students who enroll in AP courses. Klopfenstein and Thomas (2005) pointed out that to make solid claims about the benefits of AP courses, researchers must also consider factors such as family income, student ability, and academic preparation. When controlling for these factors, AP courses may not provide as much benefit in preparing students for college as is cited in some literature. Klopfenstein and Thomas did find a correlation between taking AP science or AP economics and college persistence, but not with AP math, English, or history. They also cited several studies dealing with high school rigor, noting that AP courses are not the only way to achieve rigor and high standards. Further, although there may be some benefits for students who took AP science or economics, small schools often face financial hardships when mandated to offer AP courses, since smaller schools do not always have teachers with enough specialization and training to teach the AP courses.

Dougherty et al. (2006) explored the relationship between AP course participation and college graduation rates. Their three research questions included an examination of college graduation rates for AP and non-AP students, graduation rates when controlling for student and high school demographics, and the percentage of college graduates from a

particular high school compared to the percentage of students involved in AP coursework at that high school. In their study, the authors acknowledged several explanations for why AP students may be more successful in college. First, students who enroll in AP courses tend to be motivated and strong students to begin with. Second, schools with a strong AP program tend to serve a more academically-focused and motivated student body. Third, schools with a large AP program could have other organizational factors and capacities that increase the effectiveness of the school, exclusive of the AP program.

In their research, Dougherty et al. (2006) followed 67,412 Texas 8th graders who completed high school in 1998 and subsequently enrolled in a Texas public college or university within one year. The primary finding was that the percentage of students who took and passed AP exams was the best AP-related indicator of whether a school was preparing students for college success. Students who earned a 3 or better on one or more AP exams were more likely to graduate from college within five years of enrollment. These results were consistent, even when controlling for student characteristics (e.g., free and reduced lunch status) and high school characteristics (e.g., percentage of low-income students, dropout rates, etc.). Students participating in AP courses but not passing the exam did better than their peers, but not nearly to the extent as the students passing the exam. This is an important reminder to schools attempting to increase participation in their AP program. While schools need to focus on growing their AP program, it is imperative to simultaneously examine the quality of instruction in AP and pre-AP courses, preparing students for success in the AP course and the AP exam.

Attewell and Thurston (2008) explored the impact of a rigorous curriculum on student outcomes, noting two contrasting perspectives. First, the Human Capital perspective believes curricular intensity confers new skills and achievement gains to students, even when controlling for family, academic, and school backgrounds. This is contrasted with the Credentialist view, which claims a selection bias in who takes rigorous courses. In this view, students at the top of their class will be allowed to take rigorous courses, and the fact that a student is enrolled in these courses signals the student's relative standing to his peers. The authors controlled for factors related to a student's background, and found significant differences in test scores, college enrollment, and college completion based on coursework rigor. However, the benefits in this study were noted to be smaller than some rigor advocates purport.

Sadler and Tai (2007) noted that many of the studies touting the benefit of AP coursework might over-estimate the value of AP coursework if they do not have adequate controls. Some of these studies may fail to account for family, student, and community characteristics. However, several studies exist with adequate controls for students' characteristics. For example, although Geiser and Santelices (2004) reported that the number of AP courses had little impact on freshman GPA, it appeared to be a strong predictor of sophomore grades. In addition, Dougherty et al. (2006) reported that low-income students who took AP courses had a higher college graduation rate. Sadler and Tai noted other studies over the past 40 years with mixed results as to whether AP students were more likely to pursue a college major in the same field as their AP coursework. In their work, Sadler and Tai paralleled their findings with previous studies,

noting that up to half of the perceived advantage of AP courses may come from students' background characteristics, particularly their math and verbal skills. This research indicated a benefit of taking AP coursework to the students; the authors just warned that it may not be as great as some other studies indicate.

Morgan and Klaric (2007) reviewed the academic records of over 72,000 students who entered 27 different colleges in 1994. They sought to determine how the academic careers of AP students, defined as succeeding on the AP exam, compared with non-AP students on a number of variables. This research indicated that even when controlling for SAT scores, students who took AP exams earned better grades in intermediate-level college coursework, had a higher probability of college graduation, and tended to graduate earlier and than their non-AP peers. In addition, although not controlled by student characteristics, AP students were more likely to major in a field closely related to their AP exam. Further, women and minorities who took the AP exam were more likely to pursue math and science in college.

A score of 3, 4, or 5 on an AP exam is considered a qualifying score, possibly allowing the student to receive college credit. There are a variety of factors that will determine if a college will grant credit for the AP exam score, including AP subject, desired major, and selectivity of the college. Dodd, Fitzpatrick, DeAyala, and Jennings (2002) analyzed data from incoming freshmen at the University of Texas who received an AP exam score of 3 for AP Biology, AP Calculus, or AP English Language and Composition, three of the most popular AP exams. Since the range of performance on the AP exam includes students with a "low", "middle", or "high" three on the exam, this

research attempted to determine if finer gradations in the grade of 3 would be helpful in predicting how successful students would be in college when compared to other students who received an AP exam score of 3, or to students who earned a “high” 2 or a “low” 4 on the AP exam. The data indicated that finer gradations the AP score category of three was not necessary, and that the current scoring system adequately delineates student achievement results.

Further, Dodd et al. (2002) studied the performance of four groups of students. They compared those who placed out of an introductory course in biology, math or English based on their AP score to three other student groups: a matched group of non-AP students, AP students who did not place out of the introductory course, and students who concurrently enrolled in an equivalent course while still in high school. The academic outcomes measured were grades in the subsequent course in the subject area, total number of hours taken in that subject area, and grades earned in those additional courses. The data indicated that the AP students who received credit by exam for the introductory course performed as well or better than the other three student groups. This indicated that the AP students who placed out of the introductory course were at least as well prepared as the other students who completed the introductory college course.

Colleges are changing the extent to which they are willing to accept AP scores. Changes in acceptance of AP exam scores could potentially be explained in a couple of ways. First, it could indicate, as Lichten (2000) suggested, a decline in quality of the AP experience. Sadler and Tai (2007) also made some sweeping claims and assumptions regarding the advantages of taking science courses in the college setting, questioning the

instruction in high school, the administration of the AP program, and the College Board's research findings. Alternatively, the decline in colleges' acceptance of AP scores could indicate colleges' growing feeling that entry-level courses are moving to the high school setting, reducing the number of students taking these introductory courses on the college campuses. Although Lichten asserts that the College Board could be allowing grade inflation to increase their revenues, the reverse could also be occurring as colleges attempt to protect enrollment numbers. Additionally, although it is intuitive that increasing the number of students participating in AP coursework could lead to an initial decline in test scores, educators must determine the AP program's role. Is the role of the AP program to sort and select, thus ensuring higher test scores, or is it to expose increasing numbers of high school students, especially those from underrepresented populations, to the rigors and possibilities of college?

In response to high school and post-secondary educators' concern for quality and integrity, the College Board implemented the AP Course Audit to provide high school educators clear curricular and resource requirements that must be present for a high school course to be considered "college level" and to designate it as "AP." Further, this initiative provided increased consistency for post-secondary admissions departments when reviewing high school transcripts and granting college credit for AP coursework. High schools are now required to submit a course syllabus that is reviewed by current college faculty representatives. The College Board's intent is to allow individual schools to develop curriculum, but to provide them with expectations established by post-secondary institutions (College Board Report to the Nation, 2008c).

Tracking Policies, Perceptions, and Resulting Inequities

Although AP courses are typically taken by upperclassman, the foundation must be laid in earlier years to prepare students to tackle these courses. Numerous studies have examined the issues with student placement in American high schools, including the widespread use of tracking, the ways in which students are placed into courses, and the need for educators to be aware of the effects on students (George & Rubin, 1992; Hallinan, 1994; Jackson 2008; Lucas 1999; Oakes, 2005; Oakes, 1995; Oakes & Guiton, 1990; Westchester Institute, 2002). Tracking has been seen to actually help some high-achieving students, but tends to have a negative impact on low-income and minority students, who find themselves in lower-track classes more frequently. Unfortunately, when students are placed into lower-level tracks, they are often constrained to less challenging tasks, causing them to grow more slowly in their academic skills (Ashwill et al., 1999; Lucas, 1999; Lucas & Berends, 2002; Oakes, 2005; Westchester Institute, 2002). Since it is not likely that tracking will go away, it is incumbent on both researchers and practitioners to understand the way in which students are placed into their courses and the achievement gains that result.

Freshmen students experience levels of failure, dropout, and disciplinary measures higher than any other year. Donegan (2008) contended that many educators understand these data, but they don't always act accordingly. She suggested that the best teachers in the smallest classes should teach our freshmen students. Teachers should feel honored to be selected to work with students in their most pivotal high school year. The

skills students develop and refine in their freshman year will prepare them for more rigorous coursework as they start on a high-growth trajectory.

Historically, researchers have compared schools regarding how they place students in coursework, and the resulting student achievement. Hallinan (1994) examined the effects of tracking on student achievement in several schools, seeking to answer two specific questions. First, did schools differ in the likelihood that a student was assigned to a given track? Second, did different schools provide different opportunities for learning to students assigned to the same track? The underlying premise was that some schools did a more effective job in placing students, and that the results could be seen in student achievement. The author concluded that there was significant variation across schools in how students were assigned to tracks, as well as the tracks' effect on growth in academic achievement.

In a study of Florida schools, George and Rubin (1992) reviewed the status of ability grouping at all grade levels. The study was conducted by mailing a 30-item questionnaire to a stratified random sample of 600 Florida educators. These educators were divided among teachers, principals, and central office administrators. The goal of this research was to gather information about student tracking practices. The researchers indicated by their questions that they believed tracking raised issues of equity and justice for students and classroom teachers. They concluded that tracking was widespread in Florida, especially as students progressed through school. Educators were mixed on the factors that placed students in tracks, and many of them sensed a need for change to the policies in their school.

The National Institute on Student Achievement, Curriculum, and Assessment conducted a comprehensive case study review of the educational system in the United States (Ashwill et al., 1999). In their work, they detailed the various approaches to ability grouping in junior and senior high schools. They noted general trends in the learning mode in higher track classes versus lower track classes. In accelerated or advanced classes, students were challenged to think independently and to understand underlying concepts, while students in the lower-track classes dealt with simple topics and rote skills. The researchers outlined the various methods by which students were assigned to tracks, including prior courses, grades, personal goals for college, test scores, and parental wishes. Unfortunately, students were often limited in their ability to move to higher tracks, since the skills they developed in the lower-track classes didn't prepare them for the more rigorous accelerated classes. However, the researchers noted wide variability between schools, with some schools moving away from traditional track assignments. Of importance to the current study, the researchers noted the perceptions of teachers and parents toward academic tracks. In general, parents were more supportive of separating students by ability level than educators. Parents were more inclined to believe students' ability to be successful in school arose from innate ability and family support. Likewise, teachers often stated their belief that students were destined for certain tracks based on the family environment and students' innate ability.

In a more recent study, Jackson (2008) researched tracking decisions made in Trinidad and Tobago, where students were assigned to different schools based on achievement test scores. Although the curriculum was the same across the schools,

student achievement was not, indicating the impact of peer effects and student expectations. Using a variety of statistical approaches, he found evidence that there were small benefits for attending a high-achieving school compared to an average-achieving school. However, there were large differences between attending an average-achieving school compared to a low-achieving school. This highlighted inequities in student placement, particularly for students who found themselves at the low-achieving schools. As a result, the students who were most in need of educational growth were falling further behind, resulting in lower performance and a reduced likelihood of pursuing tertiary (post-secondary) education.

Tracking and Equity in Underrepresented Populations (low-income and minority)

A study conducted with North Carolina schools focused on the number and percentage of minority students in rigorous courses, with broad implications for how schools place and support all students in rigorous coursework (Rarity, Castellino, Tyson, Cobb, & McMillen, 2001). In this study, the researchers examined the criteria used to identify students for rigorous coursework and analyzed the objectivity of the criteria. They sought to quantify the degree to which minority students were underrepresented in honors, AP, and academically and intellectually gifted (AIG) programs. Finally, they discussed how this underrepresentation contributed to the achievement gap. The researchers concluded that a link existed between early identification for AIG programs and the students who pursued honors and AP classes in high school. In addition, this report offered 20 suggestions to improve the identification, motivation, and retention of minority students in rigorous course offerings.

In a research review of ability grouping, the Westchester Institute for Human Services Research noted that the between-class ability grouping (tracking) done in most high schools benefits high-achieving students, providing the school uses enriched materials. In addition, this tracking system neither helps nor harms the low-achieving students. However, the study also noted that higher-ability courses were typically taught by more skilled teachers, posing even more of a challenge for students in lower-track courses looking to move into more rigorous courses. Low-income and minority students were disproportionately found in these lower track classrooms. Further, this review noted that simply offering students a choice to move into more rigorous courses may not attract many of these students, since feelings of inadequacy or a desire to stay in a comfortable place keeps them in the basic courses (Westchester Institute, 2002).

Although many U.S. schools have dismantled the most rigid tracking schemes in the past 40 years, tracking still occurs, and many student groups are still underrepresented in the most academically-challenging classes. Lucas (1999) used High School and Beyond data to quantitatively analyze several components of tracking in the U.S. educational system, including track placement, rigidity of tracking between disciplines, mobility between tracks, and diversity in the different tracks. On the surface, tracking decisions seemed to be made based on ability and achievement, but Lucas and Oakes (2005) noted that many factors affect track placement. Students from minority and less-educated families disproportionately end up in lower-level classes, even when achievement is controlled. Parents of these students may simply accept tracking decisions made by the school, since they are less comfortable with the school setting, less aware of

the impact of lower-level classes, and less confident to challenge decisions of the more-educated teachers. Conversely, more-educated, non-minority parents are more likely to be assertive in having their children placed in advanced classes. Further, middle-class parents often perpetuate the need for tracking, hoping to isolate their children from students who are different from their own children (Lucas, 1999). Given the research indicating rigorous coursework leads to positive educational outcomes, Lucas' work highlighted the importance of informing all parents and students about the implications of course selection. Absent this information, many less-educated parents are not able to be proactive advocates for their children. In a similar study, Lucas and Berends (2002) noted that educators must realize and explore the link between tracking and racial-ethnic and socioeconomic status. While some educators contend tracking is done to facilitate uniform levels of instruction targeted to students' ability, the authors noted that tracking is frequently accompanied by, or leads to, racial, ethnic, and socioeconomic segregation.

Expectations and Opportunities for Underrepresented Populations

> Once we realize that we are keeping low-income and minority kids out of rigorous courses, there can be only two arguments for keeping it that way–either we think they can't learn, or we think they're not worth teaching. The first argument is factually wrong; the second is morally wrong (Gates, 2005).
> Bill Gates, 2005

The understanding that schools should provide opportunities to all students is not new. Over 40 years ago, Rosenthal and Jacobson (1968) published their landmark work "Pygmalion in the Classroom." This research involved giving teachers false information about the abilities of their students. Students were randomly assigned, but teachers were made to believe some students had the potential for especially strong growth. Although

the evidence showed no special treatment for these students, the results were clear: students who were expected to learn and grow more at exceptional rates did learn and grow at exceptional rates. This is in keeping with the vast body of research on teacher expectations and self-fulfilling prophecy, which has shown the variety of ways in which educators form their expectations of students, how they express these expectations to their students, how the teachers' practices change, and the resultant effect on student learning (Brophy 1983; Good, 1987).

In its 1983 report, the National Science Foundation outlined the need to hold high standards for all students, regardless of their race, socioeconomic status, or gender (National Science Board, 1983). Other researchers in the 1980's examined the educational disadvantages that result from tracking students or limiting their opportunities in other ways. Since it follows that students can only be expected to know what they have been taught, ongoing research has examined how resources are distributed and how this might restrict or enhance opportunities for all students to learn. In the mid-1980's, RAND conducted research targeted at opportunities for students in math and science (Oakes, Ormseth, Bell, & Camp, 1990). The authors acknowledged the various viewpoints on how students gain access to learning opportunities, including working hard, possessing innate intelligence, or being from the "right" socioeconomic background. However, this study focused on distribution of resources, opportunities for rigorous courses, and quality of science and mathematics instruction.

In their research, Oakes et al. (1990) drew mostly on the 1985-1986 National Survey of Science and Mathematics Education. They found that schools serving low-

income and minority students tended to offer fewer college prep and advanced courses. Lower-income and minority students tended to be in lower track classrooms that placed less emphasis on inquiry and problem solving. These courses and teaching methods did little to promote student interest to pursue more challenging courses as they progressed through high school. High ability students at schools serving large populations of low-income students had less opportunity to accelerate their learning than lower-ability students at schools serving small populations of low-income students. School policies and cultures also played important roles in decisions impacting students' opportunities.

Oakes et al. (1990) specifically focused on science and math instruction, but these patterns extend to other disciplines. As a nation and community of educators, we have rejected the idea that less-advantaged students deserve fewer opportunities, and yet this continues to be the practice in many situations. Although not likely intentional, these subtle decisions about students' opportunities to learn often lead to less-advantaged students falling further behind their more-advantaged peers. Unfortunately, this situation will not likely go away without focused, intentional decisions. Schools with less-advantaged students often lack the political clout and receive less community pressure to provide expanded opportunities for larger groups of students. Oakes et al. suggested various measures that school districts should take to ameliorate the disparities, including distributing resources equitably and holding schools accountable for opportunities they provide their students. Nearly 20 years after this study, many of the same inequities exist.

Oakes and Guiton (1995) analyzed the practices and beliefs at three schools with differing demographic profiles. They noted the similarities and differences in the schools'

tracking practices. In their study, they used both qualitative and quantitative measures to analyze student handbooks, course descriptions, master schedules, and transcripts. The researchers also interviewed educators in these schools, and found many similarities in the schools' practices. First, placement decisions were generally seen as being fixed; once a student was in a particular track, he or she generally didn't move from that track unless it appeared that the student had been "misplaced." Second, the school in the study with the most affluent demographic mix consistently demonstrated the most sophisticated and rigorous curriculum. Third, although students and parents had some choice in course placement, it was only honored when certain pre-requisites had been completed, and often only honored if parents were willing to sign a "waiver" indicating they understood the risk involved in taking a more challenging course. Fourth, structural factors in the school affected course offerings. For example, there were often limitations in staff expertise, declining enrollments, and demographic shifts, which appeared to impact the number of students taking particular courses. In the final synopsis, the goal of the tracking decisions was to match ability with opportunity, but other factors such as cultural assumptions, structural characteristics of the schools, and persistence on the part of students and parents, often falling along certain racial lines, played key roles in how students were placed.

Kati Haycock (2001), President of the Education Trust, outlined the disconnect in how adults see underperforming students, and how the students see themselves. In her analysis, adults typically looked at minority students in poverty-stricken areas and commented about the poverty, lack of educational support at home, and poorly educated

parents. On the contrary, while students acknowledged those things matter, they spoke more about educators who didn't know their subject matter well, schools that expected too little of them, courses that didn't challenge them, and administrators that dismissed their concerns. Turque (2008b) also reported that in low-performing schools, students felt as they were given busywork, allowed to flounder and fail, and not challenged with academic rigor. Research from the Education Trust indicated that, while poverty and home conditions matter, the students might actually better understand the things that matter most. Haycock pointed out the essential components of high-achieving schools, providing examples of how these variables have impacted student learning. First, schools need to hold high standards for all students and to clearly articulate them to all the stakeholders. Second, all students need to be exposed to a challenging curriculum. Third, students must receive extra time and help when they struggle, especially when they arrive in class deficient in basic skills. Fourth, teacher quality is paramount to what students learn in the classroom.

Using Critical Race Theory as a framework, Solórzano and Ornelas (2002) examined a large school district in California serving a large population of Chicana/Latina students. Their intent was to understand how school structures and processes maintain barriers to AP courses, and how schools can respond to remove these barriers. They noted that Chicana/Latina students were underrepresented in AP courses districtwide, urban schools that served more low-income Chicana/Latina communities had lower AP enrollments, and that even in schools with more AP offerings, Chicana/Latina students were underrepresented. In their paper, Solórzano and Ornelas

noted recent court cases that cited the disparity between schools in AP offerings, and how this was problematic when considering college admissions decisions. In 1997-1998, nearly one half of California's schools offered 0-4 AP courses. These schools were often located in urban or rural areas serving large populations of minority students. When reviewing these schools' AP course enrollments, black and Hispanic students were underrepresented while white and Asian students were overrepresented. Since AP course opportunities were not equally distributed between schools, or taken at the same rates by students within schools, Chicana/Latina students missed college admission benefits. Even more importantly, not participating in AP or other challenging courses keeps students out of the "college-going culture" since AP courses are very predictive of college enrollment and success. The authors made several recommendations to rectify the current situation, including a school culture that promotes advanced study and college attendance for all students, student access to qualified teachers and intensive support systems, and greater participation in advanced courses at all levels.

In a similar study, Zarate and Pachon (2006) reviewed the AP course offerings in California public high schools. This study was a follow-up to two previous studies by the Tomás Rivera Policy Institute in 1996 and 2000. The study utilized 2003 data from the California Department of Education's California Basic Educational Data System (CBEDS) and School Fiscal Services. It revealed that between 1997-2006, the average number of AP courses offered in California high schools increased from 5 to 6. In addition, the number of schools offering AP courses increased from 739-849, an increase of approximately 15%. However, this increase did not keep pace with the addition of new

schools, meaning that there were actually more schools not offering AP courses in 2003. Over 40% of California high schools offered 0-4 AP courses in 2003. Although larger schools tended to offer more AP courses and minority students were more likely to attend large schools, schools with a higher proportion of minority students offered fewer AP courses when the researchers controlled for school size. The paper gave several policy recommendations for public schools and legislators, including improving communication to students and parents about the critical role AP courses play in determining post-secondary options, increasing funding to expand AP courses in schools with less offerings, exploring minimum compulsory AP offerings based on school enrollment, and providing opportunities to complete AP courses online.

A report by the National Study Group for the Affirmative Development of Academic Ability (2004) described the achievement gap that has persisted between white and minority students in reading, mathematics, and science, as well as gaps in SAT scores and college entrance rates. In the study, the authors noted that students come to school with knowledge and experiences, not just as empty slates onto which educators transmit knowledge. Although students arrive with different background experiences, the researchers believed that academic ability can and should be developed in schools, noting that achievement is neither simply a function of genetics nor is it a fixed characteristic. The study provided several ways schools can develop students' "intellective competence," which the report defined as habits of thinking and reasoning which lead to drawing inferences and problem-solving abilities. Schools were repeatedly encouraged to

maintain high expectations for all students, and to deliver rigorous content and experiences to all students in an unbiased, culturally-relevant manner.

In a related essay, Barth and Haycock (2004) outlined three reasons that a core-college prep curriculum should be taken by all students, regardless of race. First, students learn more in college-prep courses, regardless of ability level. Second, students are more likely to pass high-level than low-level courses. They cited the schools in El Paso, Texas and San Jose, California that serve high populations of minority students, but who made rigorous courses the default option. While enrollment numbers skyrocketed in rigorous courses, so did the number of students passing these courses. At the same time, state test scores and graduation rates rose dramatically. Third, students are more likely to find and maintain a job after taking a college-prep curriculum. Even for students not planning to attend college, a college-prep curriculum prepared students for the rising expectations of employers.

As the studies noted here indicated, a persistent achievement and participation gap exists for minority students. Klopfenstein (2004) researched the factors that contribute to this gap. She used 1998-1999 data from the Texas Schools Microdata Panel, which included public high schools in Texas that offered at least one AP course. Her analysis indicated that family income was the single most important factor contributing to the minority AP participation gap. This is particularly important for black and Hispanic students, since the study noted that they were three times more likely to be low income than white students. As noted by the author, in addition to diminished access to a culture of learning, low income students were more likely to have family responsibilities outside

of the school day, potentially inhibiting their ability or interest to tackle challenging coursework. Klopfenstein noted that large schools have more diverse AP course offerings, but lower rates of participation. The paper made several policy recommendations, including flexibility across academic tracks, creating "schools within a school" to create a more intimate environment, incentive programs for teacher training and student achievement, and teachers mentoring minority students.

Samara (2007) conducted research using student surveys in one Virginia high school. He gathered data from the students about their perceptions of the curriculum, their desire for more challenging coursework, the support for learning from the school, and the school's learning climate. The study offered several recommendations, including challenging all students with rigorous coursework, increasing support for student learning, improving the climate of support and safety for students, and ensuring that the curriculum and school practices are culturally relevant. The stinging report was met with an immediate response from the school district, which outlined the steps the school has taken and is taking to prepare all of its students for success in their post-secondary endeavors (Walsh, 2007). This case clearly demonstrates the need for communication between all stakeholders in a community, including educators, parents, students, and even outside researchers.

In their work, Attewell and Thurston (2008) noted the ongoing tradition of lower expectations for some students, and how this leads to a subtle form of discrimination. The authors found gaps in which students were enrolled in rigorous coursework, primarily stemming from a student's socioeconomic status (SES). Although African American

students had a better chance of taking rigorous courses than other students of a similar SES, the disproportionate numbers of ethnic minorities at lower levels of SES led to large racial gaps in opportunities.

Examples of Schools Making a Difference with Diverse Populations

Although much of the research about equity in course offerings focuses on challenges faced by low-income and minority students, educators' beliefs can result in inequitable decisions for any student. The Southern Regional Educational Board has an ongoing initiative, High Schools That Work, focused on opening opportunities for all students to succeed. As outlined in Bottoms (2003), schools must believe that all students can learn, give them the opportunity to do challenging coursework, and then expect them to learn the material. There are schools noted by Bottoms that worked with diverse student populations and continued to meet these goals. These successful schools had several commonalities, including good principals, effective teachers, demanding curriculum, and high standards for all students. Further, these schools looked for creative approaches to help struggling students, such as providing additional learning support, utilizing the summer months, and doubling up on key curricular areas when learning deficits persisted into the high school years.

The Education Trust (2005) conducted research with seven schools to determine the characteristics and practices of schools that effectively improved the academic achievement of previously low-performing students. The research included a year-long analysis of four schools considered "high impact," and three demographically-similar schools considered "average impact." Schools considered for the study each had

significant minority student populations, demonstrated math and/or reading proficiency levels greater than state average, achieved greater-than expected academic growth with previously low-performing students, demonstrated the ability to keep students in school, and had an average or declining achievement gap. Although all of the schools shared some similarities, the high-impact schools demonstrated some patterns that set them apart from the average-impact schools. The school culture of high-impact schools focused intently on not only preparing students for graduation, but also for success in college and careers. Teachers embraced the value of external standards, and focused on their students' achievement of the standards. In high-impact schools, students spent more time in grade-level or college prep courses. In addition, barriers to high-level courses were removed, encouraging all students to challenge themselves and reach the schools' high expectations for each student. Once in these courses, teachers and counselors took responsibility to help students learn and provided the additional support needed to ensure this occurred.

In a joint report between ACT and The Education Trust (2005), researchers investigated patterns among ten American high schools that were effectively preparing student populations that are traditionally underrepresented in postsecondary education. The researchers sought to determine how these ten schools ensured all students were able to arrive at college without the need for remediation or basic courses to fill learning gaps, providing a smooth transition from high school to college coursework. In the ten schools studied, common themes emerged, and the researchers made recommendations for successfully preparing students for postsecondary education. First, all students should

have access to rigorous, college-oriented curriculum. Second, all students should be instructed by highly qualified and highly skilled teachers. Third, all students should have access to additional help and support outside of the classroom. Fourth, the content and skills taught in the classes should be continually re-evaluated to remain focused on college and work readiness.

In New York, Elmont Memorial Junior-Senior High School serves a population of nearly 90% African American and Hispanic students. The school's administration and faculty worked diligently to improve instruction through collaborative inquiry and intensive teacher observations. While expectations for teacher improvement are high, so are the expectations for all students to learn. In 2006, approximately 99% of the senior class graduated, with more than 90% of those students attending college. However, the school dedicated itself to preparing students to not only attend college, but to graduate from college. Consequently, students are expected to take challenging courses, and to do well in all of their courses. Nearly 100% of the students passed the Regents English Exam, and approximately 95% passed the Regents Math Exam. Further, in 2006 more than 90% of the students earned the coveted Regents diploma, and 41% of the students earned the advanced Regents diploma, which requires even more rigorous coursework for students (Chenoweth, 2007).

Gatekeepers to AP: Why We Must Remove Them, and How We Can Do It

> When students are not considered ready for AP and denied the opportunity to take those courses, they and their teachers don't get a chance to measure themselves against the incorruptible standards of an AP exam written and graded by outside experts (Matthews, 2008e).
>
> Jay Matthews

Tracking students by ability group often leads to inequities. Students may find themselves with unmotivated peers, learning watered-down curriculum, and performing tasks requiring little critical thinking. Futrell and Gomez (2008) contended that we must remove gatekeepers and provide access to rigorous courses for all of our students, especially low-income students, racial and ethnic minorities, and English language learners who are often precluded from taking advanced courses due to traditional tracking systems. Although many of these students may be denied access to rigorous coursework, they are held to the same state requirements. Schools that have effectively opened access to rigorous courses have realized changes must begin in early grades, reducing class sizes where appropriate, monitoring student progress, and focusing on professional development.

Numerous educators and writers are calling for increased access to rigorous coursework, including AP courses (Futrell & Gomez, 2008; Manzo, 2004; Matthews, 2008c; Matthews, 2008d; Matthews, 2008e; National Research Council, 2002). At the heart of this pursuit is the belief that if students are willing to work, they can be successful in rigorous courses, such as AP. Many educators also believe that wider access to AP courses is one way to close the achievement gap between white and minority students, and that students' willingness to work hard is as important, or more important, than a student's intelligence. These beliefs indicate the need for an effort-based belief system (Dweck, 2006; Westerberg, 2009). Dweck referred to two possible mindsets that people possess. The "fixed" mindset believes that each person is born with a certain amount of intelligence. However, the "growth" mindset is based on the premise that our

basic qualities, temperaments, and even intelligence can be cultivated, and that our true potential will only be realized through persistence and hard work.

In order for more students to be ready for the challenge, schools must consider many factors on student preparation, including the rigor of non-AP courses, tutoring and support for struggling students, study periods, and even on-line support. There are additional challenges that schools face in expanding their AP offerings, including finding or training enough qualified teachers, alleviating parents' concerns about potential stress to students, and preventing the AP curriculum from being "watered down" with increasing enrollment (Manzo, 2004).

Unfortunately, diverse school policies play a role in the opportunities students are afforded to take AP coursework. Attewell (2001) found that in many highly-acclaimed high schools, unless a student was near the top of his or her class, he or she was often less likely to take AP courses than students with comparable standardized test scores at less prestigious high schools. This reality stems from a variety of possible explanations, including school leaders who may fear that a more diverse AP enrollment would lead to a drop in AP scores. This drop could potentially lower the school's standing with elite universities. As a result, Attewell offered several explanations of how these schools hold students back, including advising their second-tier students to take less rigorous courses, exercising grading scales and policies that distanced the top students from the rest of the student population, and reserving AP courses for students who will be most likely to score very well on the AP exams. These issues are an important consideration for all schools, but are particularly critical in schools such as the schools in the current study,

many of which serve economically-advantaged students. It is possible that some of these schools exhibit some of the practices outlined by Attewell.

The doors to AP courses are not always open for all students. Gatekeepers are often used to regulate enrollment, including high test scores, grades in previous courses, teacher recommendations, and waivers from parents if students don't meet the prerequisites, indicating the school will not be responsible if the student struggles. Many educators feel these gatekeepers perpetuate inequities in public education, especially for traditionally underrepresented student groups (National Research Council, 2002).

As noted previously, there are many ideas and initiatives for increasing access to rigorous courses, including dual-credit, AP, and IB courses. However, there is not universal agreement about the role of college level courses in high school or in who should be allowed to take them. Some educators and researchers believe advanced coursework was designed to meet the needs of "bored" students looking for more challenges, and that these courses should be preserved for our most able and intelligent students. Others disagree, citing the historical lack of rigor in American high schools, and the gains minorities have made by taking advanced coursework in high school (Congressional Quarterly, 2006).

Although a leading proponent of expanding access to AP coursework, Jay Matthews has sought to provide a balanced perspective, drawing on the experience of educators who may not agree with him. In an attempt to provide multiple perspectives, he printed a "discussion" he had with Chester E. Finn, Jr. (Matthews, 2008c). Addressing the dilemma for many educators, Matthews and Finn provided a balance in their views.

Finn noted that many schools and parents push students to take "easier" AP courses (e.g., psychology, human geography) to claim an AP experience. In addition, schools often offer incentives to take the AP exam, such as not having to take the course's regular final exam. Since AP scores often don't arrive at the schools until later in the summer, students may not always be motivated to study in the second semester, instead using the AP exam as a way out of studying hard and learning the material. Matthews adds that, although AP is not for everyone, it is for more than are currently enrolled or encouraged to do so. This is supported by PSAT scores indicating two to three times more students could succeed in AP courses than those currently taking the courses.

In a two-year review of high school advanced study in mathematics and science, the National Research Council (2002) analyzed advanced study of mathematics and science, primarily focusing on the AP and IB programs. Although the council noted room for improved pedagogy in these programs, it acknowledged that these programs were no longer for the academic elite, but had become a mainstay for students desiring to gain admission to selective colleges. To ensure greater access to these courses, especially to traditionally underrepresented populations, the council recommended schools' taking a comprehensive look at student preparation in mathematics and science, coordinating the curriculum and instruction from grades 7-12. Further, they recommended eliminating remedial courses in which there are reduced academic expectations. If students are to be capable of tackling advanced coursework in high school, they must be exposed to rigorous courses much earlier than their experience in an AP or IB course.

Large-Scale Policy Measures to Promote Access and Equity in AP Enrollments

> The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have too little.
>
> Franklin D. Roosevelt
> The FDR Monument, Washington, D.C.

Numerous organizations monitor the initiatives taken by individual states to increase equity in students' opportunities to take AP courses. Martinez and Bray (2002) noted the various policies states have put in place to improve the quality of education. Policy actions include requiring schools to offer AP courses, providing financial incentives to schools that increase AP participation, offering financial resources to train more AP teachers, subsidizing student fees for AP courses and exams, and including AP courses in the state's accountability plan. In its 4th Annual AP Report to the Nation (2008a), the College Board highlighted 20 states that have taken measures to facilitate and fund professional development activities for teachers of both AP and pre-AP courses. In addition, the report listed nine states that have passed legislation specifically focused on expanding access to AP courses for all students. The Education Commission of the States (2008) described actions taken by 13 states to either mandate all schools' offering AP courses, or at least to encourage greater student access and participation.

In an effort to expand access to AP courses, the National Governors Association piloted an AP Expansion Project in six states. The goals of the project were to make AP courses more widely available, recruit non-traditional students, and ensure success for students once they enroll. The states in the pilot included Maine, Wisconsin, Alabama, Kentucky, Georgia, and Nevada. Schools in these states were able to obtain grants to

expand their AP course offerings and student participation. As the school districts in these states attempted to increase AP participation, they encountered familiar barriers, including lack of teacher training, inadequate financial resources to create new classes, lack of rigor in the pre-AP courses, and minority and low-income students' reticence to enroll. However, the 49 schools in the pilot saw promising results in the early stages of the project, including AP course enrollment increases of 62% for minority students and 57% for low-income students. In addition, the participating schools increased their AP offerings by 27% (McNeil, 2007).

The state of Illinois, in which all schools in this research study are located, "encourages" schools to offer rigorous curriculum to prepare students for AP coursework. Further, the state board was directed to pursue additional funds from the AP Incentive Program and the Math-Science Partnership Program to prepare students for AP courses and college. The Illinois State Board of Education Website (2008) listed 18 schools that were awarded Advanced Placement Grants for 2009.

A report from the U.S. Department of Education's Office for Civil Rights (2004) spotlighted additional efforts taken by states to improve access to AP courses, especially targeting low-income and minority students. In Texas, private funds of $500,000 were secured to provide fee relief for AP examinations and to provide training for teachers working with underrepresented populations. Later, these funds were allocated from the University of Texas budget. In Kentucky, students were provided access to AP courses on the internet through Kentucky Virtual Schools, allowing students access to more AP courses than are offered in their local high school (Kentucky Virtual Schools, 2008).

The state of Arkansas implemented a policy for AP expansion, in which the State Board of Education stipulated that each school district must provide at least one AP course in each of the four core disciplines (English, math, science, and social studies). In addition, "Pre-AP" courses must be established to ensure students possess the necessary skills to be successful in an AP course. Further, the document dictated the training necessary for teachers. The goal of this program was to prepare more students for college admission and success (Arkansas Department of Education, 2007). Although this document appears to be a step in the right direction, one must question if establishing some courses as "Pre-AP" means that other courses are not rigorous enough to prepare students for a college-level experience. If so, what will ensure that students in the other courses are given the opportunity to catch up to their high-achieving peers?

Incentives for Students and Teachers to Increase Participation and Success

In an effort to increase the number of students taking and passing rigorous courses, states and school districts across the country have worked to recognize student achievement and implemented incentives for students and teachers (Associated Press, 2008; Cech, 2008b; Grier, 2002; Singer-Vine, 2008; Turque 2008a). The incentives have included prepaid cell phones, MP3 players, or simply cash for better performance. For example, Baltimore students earned up to $110 for improved state test scores, Washington, D.C. students earned money for good grades in the Capital Gains program, New York Students earned up to $1,000 for high AP exam scores through the Rewarding Achievement program, Connecticut students earned money from a National Math and Science Initiative grant, and Texas students earned up to $500 from the Dallas nonprofit

group Advanced Placement Strategies for high AP scores (Associated Press, 2008; Singer-Vine, 2008; Turque, 2008a). Florida teachers have earned financial incentives for students' success on AP exams, receiving $50 for each AP exam grade of 3, 4, or 5 (Education Commission of the States, 2008; U. S. Department of Education Office for Civil Rights, 2004).

The Texas program is often cited as one of the most successful programs in raising AP participation and achievement. It specifically targeted 100 Texas high schools with large minority and low-income students. A unique feature of the Texas program is that it also provided incentives for teachers, a missing component in many of the other programs. Teachers received annual bonuses of up to $10,000 for helping more students achieve better results on AP exams. Research by Kirabo Jackson (2007) indicated that more Texas students are taking AP and IB exams, ACT and SAT scores are increasing, and more students are choosing to attend college. Further, the research provided evidence that while the incentives appear to be working, many of the gains are a result of increased access for more students to AP courses, changes in teacher and student attitudes about AP courses, and better information for the students about the options and importance of AP courses. While some educators are concerned that the incentives will decrease students' intrinsic motivation and are worried about what will happen when the incentives are gone, many educators have been willing to utilize these incentives if they will help more students learn.

Providing Support for Students

Although schools can provide access to rigorous courses and opportunities for all students to learn, the reality is that not all students show up in high school with the same background experiences or home support to succeed. As Ferguson (2007) wrote, there are disparities in home structure for minority students compared to white and Asian students. These differences at home should not be used as an excuse for why schools can't educate all students, but rather to understand the additional support necessary for some students to excel. Ferguson highlighted differences between races in parenting, as well as family support in areas such as accessibility to computers, number of books in the home, and cultural influences such as music choice. Further, he noted the challenge of African-American students being accused of "acting white" when they choose to work hard and excel in school. Educators must understand these current realities as they set policies for working with families and providing various supports for the students in their schools. Recognizing these needs, many schools, such as those in Ann Arbor, Michigan, have put additional supports in place, including teaching study skills and providing tutoring when necessary (Steptoe, 2004).

Other research has shown ways in which schools can maximize the AP experience for students once they enroll in the AP courses. Paek, Braun, Trapani, Ponte, and Powers (2007) analyzed the relationship between teacher practices in AP U.S. History and AP Biology, and student success on AP exams. The researchers constructed survey instruments, which were eventually completed by 1,171 AP Biology teachers and 1,219 AP U.S. History teachers. The survey questions covered a wide range of topics, including

professional development activities, resource availability, types of assignments used, variety of assessments implemented, expectations and support for students, and alignment of curriculum with the AP exam.

Since the goal of Paek et al. (2007) was to determine the impact of teacher practices on student achievement, the researchers attempted to measure the achievement gains related directly to the teachers. Although this is a challenging endeavor, they used the PSAT/NMSQT score as a baseline, and measured gains in student achievement from that predictive test. Since the students were not randomly assigned to teachers in the study, no causal inferences can be made. However, the research demonstrated several consistent relationships between teacher practice and student performance on AP exams. First, professional development was consistently significant among teachers of both courses, although professional development activities were not necessarily consistent. Second, an emphasis on higher order thinking skills, such as developing historical research skills, emphasizing the scientific method, and writing extended responses in AP Biology showed a strong association with AP exam success. Third, from a school policy standpoint, the percentage of students who took the exam and the frequency of class meetings were significant for both courses. Scheduling classes that met every day appeared to be more helpful for student success than compressing the courses or using a block-scheduling format, and classes that had more students taking the exam typically performed better than those with fewer students taking the exam. Finally, students performed better when teachers found the AP Exam topics and rubrics influential in teaching their course.

Schools Moving Toward Expanding Access for More Students

> We believe that schools can improve if they are willing to re-examine and challenge traditional ideas about who should have access to the best curricula they offer (Burris & Garrity, 2008, p. 2). Providing all students access to the school's best curriculum, with support for those who struggle, gives students the opportunity to achieve based on high learning standards" (p. 15).
>
> Carol Corbett Burris and Delia T. Garrity

If research is clear that high expectations lead to high achievement, there appears to be a "knowing-doing" gap, since not all schools have implemented practices to the same extent. This is the contention made by Pfeffer and Sutton (2000) after investigating companies' ability to excel and close the "knowing-doing" gap. The challenge is taking an organization from knowing the best practices to actually implementing these beliefs and ideals. Pfeffer and Sutton suggested that taking action is the key, and this section examines schools that have taken action to hold high expectations for all students and expand access for more students.

The Southern Regional Education Board conducted a review of 44 middle schools and 38 high schools to investigate patterns among schools that place significantly more students in freshman college prep courses than those that don't. In this research, Cooney and Bottoms (2003) determined that while some schools placed a significantly larger percentage of their students in rigorous college prep courses, their students' success rate in those courses was similar to schools placing significantly fewer students in college prep courses. This indicated that when there was an expectation of success, students rose to the challenge. In looking for patterns between the schools, Cooney and Bottoms noted that although the schools with higher college prep enrollments were very diverse racially

and socioeconomically there were some shared characteristics. These schools had an expectation that students would learn and achieve at high levels. Further, these schools provided extra help, including tutoring before, during, and after school; mentoring in programs such as "Big Brothers, Big Sisters;" doubling up on academic courses; and offering summer school sessions. In addition to the support and culture in place at these schools, the study's authors recommended schools examine their placement practices. Giving students opportunities and exposure to these rigorous courses early in their high school careers provided them both the skills and confidence necessary to enroll and succeed in AP courses later in high school.

Describing one district's initiatives to expand access to its AP program, Grier (2002) outlined several district-wide measures. Initially, the district leadership mapped out a quantifiable plan for AP growth. The district utilized the PSAT exam and developed a PSAT profile for each student, allowing capable students to be identified. In the course of this work, district leaders found that significantly more students were prepared to take AP coursework than were actually enrolled in the courses. The district stopped requiring students to have letters of recommendation or GPA requirements to enroll. Further, students were actively recruited utilizing both school and community resources. AP teachers received training and professional development. To encourage student participation and success, the district decided to pay the exam fee for students' taking the exam, and partnered with local businesses to reward and recognize the students' accomplishments.

Rodrigues (2004) described a unique cooperative effort in Massachusetts between the Worcester Public School and Clark University. University Park Campus School implemented a lottery system to draw students from the poorest neighborhood in Worcester, comprised of a high minority and ESL population. The school utilized catch-up strategies for middle-school students to ensure all were ready for rigorous courses in high school. Once in high school, all students were provided an honors-level curriculum. Students were able to take AP courses beginning in 10th grade and courses at Clark University beginning in 11th grade. Combining these policies with a faculty committed to the success of each student, University Park Campus School emerged as one of the highest performing schools in Massachusetts. Chenoweth (2007) reported the student performance at University Campus where, in nearly every year from 2002-2006, 100% of the students passed the Massachusetts Comprehensive Assessment System exam for both math and language arts. In each of those years, the school outpaced the average results for the state of Massachusetts.

Prince George's County, near Washington, D.C. has seen its AP participation jump by nearly 50%. While increasing enrollment numbers were initially met with a drop in the percentage of students passing the AP exam, more students were exposed to the rigors of college courses and greater numbers of students earned a passing score, going from 1815 in 2007 to 2145 in 2008. Some have expressed concerns about the increasing number of students taking the courses and the potential for failure, but the district continued to look at the rigor of pre-AP courses and professional development to prepare more AP teachers (Matthews, 2008e).

Although most American high schools track students into ability groups, some schools are moving toward grouping students heterogeneously. In a review of the detracking movement, Hallinan (2004) cited her previous research that indicated students grow more in rigorous courses, no matter their skills when they started. The ramification of this finding is that students must have access to rigorous courses, giving them the opportunity to challenge themselves and grow in their skills. South Side High School, located in Rockville Centre, New York is a school that has seen the effects of de-tracking. Beginning in the late 1980's, teachers and administrators began the process of eliminating academic tracks in the district's middle school. The new curriculum was modeled after the previous honors curriculum. Other changes took place in the district, such as incorporating the elementary gifted enrichment program into all of the classrooms, eliminating entrance criteria for accelerated math and science courses, and setting aggressive goals for students to move toward taking AP calculus in high school and graduating with a Regents Diploma, the highest level offered in New York. Although the changes initially met with some resistance from teachers and community members, intensive and practical professional development workshops equipped teachers with the skills to become more strategic instructors as well as giving them time to collaborate and share with colleagues (Burris & Garrity, 2008; Garrity, 2004).

The results at South Side High School were impressive. Even as enrollment increased by 25% in AP calculus, the percentage of students achieving qualifying scores on the exam increased. In addition, significantly more students successfully completed other courses such as trigonometry and IB English, and the scores on the Regents exams

increased significantly. Over 80% of the class of 2007 took at least one IB course, with one-third of these students earning an IB diploma, up from the 1997 levels of 30% and 6%, respectively. Even with increased participation, IB exam scores remained high. Indeed, this district found that equity does not have to be sacrificed to achieve excellence (Burris & Garrity, 2008; Garrity, 2004).

Another school that successfully dedicated itself to expanding access to AP courses was The Preuss School USCD. It opened its doors in 1999, admitting only students from low-income homes and aggressively exposing them to rigorous coursework. Students take at least 6 AP exams before graduation, so it is no surprise that all Preuss students earn at least one passing AP grade (Matthews, 2007b).

In the Los Angeles Unified School District, the board of education adopted the "A-G" program to define 15 classes that students needed for admission to California's public universities. In some cases, the program has prompted growth in students' participating in college prep courses. However, in some schools, especially those serving the neediest students, the availability of rigorous courses and the numbers of students enrolled in them lag far behind districts serving more affluent populations. Some students were very disappointed by this trend, noting that they want higher expectations and that they would work to attain them (Song, 2008). Still other schools considered or implemented policies for all students to take a particular AP course (Heffter, 2008; Matthews, 2008b).

The Bellevue School District in Washington state has five high schools, all of which consistently rank among the nation's best in providing AP courses to all of their

students. Riley (2006) described how the district attempted to provide every one of its students with an educational experience traditionally reserved for only the best students. This experience included a solid set of core courses and one or more AP or IB courses. In 1998, approximately 500 AP tests were taken in the district's schools. By 2007, nearly 4,800 AP tests were taken by students in the Bellevue District, while maintaining a pass rate above the national average. In 2005, 84% of the graduating class completed at least one AP or IB course. This rapid increase was driven by a district-wide initiative of setting high expectations for all students, determining what students need to know for success in advanced courses, articulating expectations for middle-school students, partnering with the College Board, and providing intensive staff development for teachers. When students did not show adequate progress, the school proactively intervened (Bellevue School District, 2008; Riley, 2006; U.S. Department of Education Office of Civil Rights, 2004).

Across the country, there are numerous examples of school districts pursuing ways to ensure all students are ready for the challenges of college, even in low-income and high minority school districts. There are many strategies being put in place, including arranging college tours for increasing numbers of students, instituting rigorous high school exit exams, practicing writing college application essays in class, and providing more AP course offerings (Rimer, 2008). Chicago is considered to be a national leader in improving the transition for its students from high school to college. It created the department of postsecondary education and student development, and saw the college attendance rate of its students increase from 43.5% to 50% during the first three years of

the department. Some of the initiatives included taking students on college visits over spring break, having students apply to multiple schools, and implementing the AVID program that teaches study skills and provides academic support (Samuels, 2008).

Other schools have used a variety of approaches to provide broader access to more rigorous classes. Students in Waukegan, Illinois now have the ability to enroll in a College Studies Program when they enter high school. In the past, students were required to meet certain eligibility criteria (Pagelow, 2008). In Elgin, Illinois, requirements were changed so students could no longer take pre-algebra in high school. Instead, students will need to take three years of rigorous math, including two years of algebra and one year of geometry, exceeding the state's new 2010 math requirements (Lester, 2008). Schools have seen measures such as these having an impact, as increasing numbers of students are taking AP courses (Brooks, 2008; Sadovi, 2008). In Chicago, the number of students taking an AP exam has risen more than 108% in the past four years. Although gaps remain between white and minority students, significant gains were made for all students' AP participation, especially Hispanic students who showed a 243% increase in the number AP of qualifying scores in the past eight years (Sadovi, 2008). Similar results are being seen nationwide. Although there have been some declines in AP exam scores, more students are taking advantage of AP courses, both in specific schools and in the United States as a whole (Banchero, 2008; de Vise, 2008; Lewin, 2008). To motivate and reward even more students to rise to the challenge of taking more AP courses, some schools, such as in Brevard County Florida, have investigated or implemented programs to recognize students taking significant numbers of AP courses (Spitzer, 2008).

Comparing Schools Based on AP Performance

Americans like to compare just about everything, from product quality to stock performance. High schools have not been exempted from these comparisons, especially in light of increasing national attention to meeting state standards, and the failure of some schools to make adequate yearly progress. Educators and the general public debate the exact role high schools should play in the lives of American students. Some say high schools should prepare all students for college, while others believe students should be sorted, with some being more focused toward vocational training or the workforce (Kantrowitz, 2007; Murray, 2008).

In recent years, schools have been compared and ranked on numerous criteria, most notably AP participation and success rates. Jay Matthews is one of the leading voices in touting the merits of AP courses in high school. Over 10 years ago, he devised the Challenge Index, used by Newsweek Magazine and the Washington Post to rank schools based on their participation rates in AP and IB courses. He believes the index provides a standardized method to compare the readiness of a wide range of students to do post-secondary coursework. He has used this index to highlight schools that are exposing large percentages of their students to AP coursework by comparing the number of AP tests taken in a school by the number of graduating seniors (Krantowitz, 2007; Matthews, 2007a; Matthews, 2007b).

U.S. News & World Report introduced a similar approach to ranking schools, although its analysis follows a three-step approach. The first step analyzes whether the school's students are performing better than statistically predicted based on the number of

economically-disadvantaged students. Second, schools are measured on how well their black, Hispanic, and low-income students perform compared to similar students throughout the state. The third step analyzes the percentage of graduating seniors who took an AP exam compared to the number of seniors in the school, as well as how successful students were on the exams (Morse, 2007). The primary difference between the U.S. News & World Report methodology and Newsweek's Challenge Index is the specific analysis of schools' minority and low-income students' performance compared to the rest of the state and the other students within their own school.

Although magazine readers are drawn to a simple statistic that attempts to quantify the quality of schools, several educators have cautioned against relying on a single number to measure the success of a high schools or the degree to which students are being exposed to a rigorous course of study. Tedrow (2007) pointed out that although these rankings enable magazine publishers to generate sales, they may add hurdles or distractions for school leaders. Further, rankings naturally create "winners and losers," causing some schools to believe what they are doing is not being valued. She also expressed concern that increasing the focus on AP courses to drive up numbers diverts some students from exploring their personal interests and strengths, and enjoying learning for its own sake. In fact, some educators have asked Jay Matthews to not be included in the Challenge Index, stating that a single number doesn't adequately represent the school's success in developing students as independent thinkers. Although Matthews (2008a) agreed with this critique and welcomed the dialogue, he still contended that his

index offers a basis to compare how well schools provide increasing numbers of students to a standardized, rigorous curriculum.

The College Board also tracks participation in the AP program on the school, state, and national level. Their metric is called the Equity and Excellence Score, representing the percentage of graduates that earned a score of 3, 4, or 5 on an AP exam. In its 4th Annual AP Report to the Nation (2008a), the College Board highlighted the top states in terms of Equity and Excellence, with each of the following states having over 20% of its graduating seniors successfully pass an AP exam: New York, Maryland, Virginia, Florida, and Massachusetts. The report also highlighted the fact that in 2002, 11.7% of students nationally passed an AP exam, while 15.2% of U.S. students did in 2007. Unfortunately, there were still gaps between white students and minority students, which were also outlined in the report. Especially troubling were the numbers for African American students, who made up 14% of the student population, but only 7.4% of the Class of 2007 AP examinees. Hispanic students were doing much better, making up 14.6% of the student population and 14.0% of the examinee population. States such as Florida were highlighted for their efforts to increase Hispanic student participation and success. However, there were many states and schools in which Hispanics lagged far behind the white and Asian student populations.

Educational Leaders' Beliefs and Perceptions About Access to AP Courses

While there are substantial benefits to a college education, American students often arrive on campus without the knowledge or skills to help them be successful. With approximately one third of incoming college students needing remedial coursework,

clearly there is room for improvement (ACT, 2005; Boswell, 2000; Education Trust, 2008). Myriad researchers have investigated various options for closing these gaps in learning. One of the most often-cited solutions is increasing the rigor of American schools, challenging all students to reach their full potential, whether that includes pursuing post-secondary education or entering the workforce immediately after high school (ACT, 2005; ACT, 2007; Adelman, 1999; Adelman, 2006; Florida Department of Education, 2005; Matthews, 2005; Matthews, 2008c; Matthews, 2007b; Riley, 2006; U.S. Department of Education, 2000).

Unfortunately, not all students are afforded the same opportunities. Opportunity gaps and achievement gaps appear between students based on their school, race, or socioeconomic status. As noted earlier, many researchers have investigated the tracking systems in American high schools and the subsequent challenges, especially for students assigned to the lower tracks (Ashwill et al., 1999; Darity et al., 2001; George & Rubin, 1992; Hallinan, 1994; Lucas, 1999; Lucas & Berends, 2002; Oakes, 2005; Oakes & Guiton, 1995; Oakes et al., 1990; Westchester Institute, 2002). Placement decisions lead to some students' receiving lower-quality instruction, including a focus on less complex topics and thinking skills. In addition, tracking decisions impact who gains access to rigorous courses in early high school years. These decisions, in turn, often dictate the options for college-level courses in high school. Although AP courses are only one way to measure the quality of high schools, they do provide a straightforward way to quantify opportunities for students to tackle rigorous coursework, ultimately leading to more successful college outcomes and tuition savings.

Gaps in the Existing Literature

Educators play a critical role in which students take AP courses, either by setting policies for the school, recruiting students, encouraging capable students, or providing teacher recommendations. Reviewing the literature, there is some existing research that investigated educators' perceptions on student ability and placement decisions. In a study closely related to the current study, Wilkins (2006) examined differences in teacher perceptions in three constructs: access for all students, grade requirements in pre-requisite courses, and the necessary degree of instructional differentiation in AP courses. She surveyed teachers from regular, honors, and AP level courses. She concluded that a significant difference existed between the groups of teachers in all three constructs. She noted a continuum of responses, with the regular-level teachers having the most restrictive perception on how students should be given access to AP courses, the need for high grades in pre-requisite courses, and a lower degree of necessary differentiation in AP courses. In each case, the AP teachers were more likely to perceive that more students were able to challenge themselves with AP courses, believed in less restrictive entrance requirements, and saw the importance of differentiation in AP courses to meet various student needs. The honors-level teachers fell in between the regular level and AP teachers in each area. This research indicated a range of perceptions among teachers. Those most directly linked to the AP courses saw the opportunities for more students to enroll in these courses. However, the regular level teachers were not as confident in students' ability to tackle the rigorous coursework.

While other researchers have analyzed educators' perceptions on student placement and opportunities (George & Rubin, 1992; Oakes & Guiton, 1995; Wilkins, 2006), there are gaps in the literature that will be closed by the current study. First, the existing literature analyzed teacher responses, but the current study will specifically measure the personal beliefs and perceptions of school principals, a group often responsible for establishing school placement policies and directly guiding students in their course selection. Second, the current study will specifically quantify and connect these responses to how many students are successfully tackling challenging AP coursework. This research will link equity in achievement to school principals' personal beliefs and perceptions about the opportunities for students to be placed in rigorous courses. By comparing personal beliefs and perceptions across high schools where students experience differing rates of AP participation, we can better understand how school cultures and practices relate to the percentage of students succeeding in AP coursework.

The College Board has an equity policy statement to communicate its emphasis on expanding the AP program to as many students as possible. Increasing equity and encouraging schools to take measures to expand access is a focal point of the College Board's most significant publications (College Board, 2008a). In its 2002 report on this matter, "Opening Doors: Strategies for Expanding Access to AP," the College Board cited numerous schools working successfully to remove barriers to students' taking AP coursework. There are several strategies these schools have used, including:

- Eliminating pre-requisite courses

- Providing special study sessions for students
- Recruiting students for AP courses, often targeting underrepresented students
- Aligning curriculum vertically between grade levels
- Providing ongoing professional development for teachers
- Establishing flexible and creative schedules
- Communicating with the community, sometimes using media outlets

Research Construct Development

The literature presented in this chapter highlighted several ways in which students are afforded opportunities to successfully pursue and complete AP coursework. The constructs for the proposed study arose from a synthesis of this literature, touching on the various practices successful schools have implemented. The research constructs are explained below, with a brief summary of the literature used in the development of the construct and the questionnaire. In addition, during the content validation process for the research questionnaire, two of the constructs were re-named to more effectively reflect the literature and the questions that arose from the literature review. Those changes are noted below.

Value of AP Coursework and Communicating That Value to Stakeholders

Numerous studies reviewed in this chapter highlighted the predictive value of AP coursework to college success, and how AP students compare to students who take introductory college coursework in the college setting. Willingham and Morris (1986) found that AP students were more likely to achieve at high levels in college, and that AP exam grades are very predictive of college success. Other researchers found similar

results for AP students in college (Dodd et al., 2002; Dougherty et al., 2006; Morgan & Ramist, 1998; Morgan & Klaric, 2007).

In its 2002 report, "Opening Doors: Strategies for Expanding Access to AP," the College Board cited numerous schools working successfully to remove barriers to students' taking AP coursework. Among the successful strategies was communicating the opportunities provided by the AP program. In their review of California schools' access to AP courses, Zarate and Pachon (2006) made several policy recommendations for public schools and legislators, including improving communication to students and parents about the critical role AP courses play in determining post-secondary options. Haycock (2001) also pointed out that high-achieving schools hold high standards for all students and clearly articulate them to all the stakeholders.

General Course Offerings

Researchers widely agree that schools must provide access to rigorous courses for all students, citing outstanding results when this occurs (ACT and the Education Trust, 2005; Burris & Garrity, 2008; Chenoweth, 2007; Futrell & Gomez, 2008; Garrity, 2004; Hallinan, 2004; Haycock, 2001; Rodrigues, 2004). Barth and Haycock (2004) found that, regardless of ability level, students learn more in college-prep courses, are more likely to pass high-level than low-level courses, and are more likely to find and maintain a job after taking a college-prep curriculum.

Since students typically take AP coursework during their junior and senior years, the academic placement and course selection in earlier high school years plays a role in which students will be ready to take AP courses. The literature contains multiple studies

dealing with student placement in American high schools, including the widespread use of tracking, the ways in which students are placed into courses, and the need for educators to be aware of the effects on students (George & Rubin, 1992; Hallinan, 1994; Jackson, 2008; Lucas, 1999; Oakes, 2005; Oakes, 1995; Oakes & Guiton, 1990; Westchester Institute, 2002). Unfortunately, when students are placed into lower-level tracks, they are often constrained to less challenging tasks, causing them to grow more slowly in their academic skills (Ashwill et al., 1999; Lucas, 1999; Lucas & Berends, 2002; Oakes, 2005; Turque, 2008b; Westchester Institute, 2002).

In its 2002 report, "Opening Doors: Strategies for Expanding Access to AP," the College Board noted that successful schools align curriculum vertically between grade levels, preparing more students to eventually tackle an AP course. The National Research Council (2002) made similar recommendations in their review of advanced (AP and IB) mathematics and science coursework.

The title of this construct was modified during the content validation process for the questionnaire. Originally, the construct referred to vertical alignment of courses and pre-AP coursework. However, the feedback from reviewers noted that the literature citations and the questions referred to the overall course offerings in a school, often indicating the degree to which school leaders believe their entire population of students is able to tackle rigorous courses. Further, "pre-AP" implies that other courses in the high school don't prepare students for AP coursework. Thus, the title of the construct was modified to "General Course Offerings."

AP Placement Policies—Open vs. Limited Access

School policies play a role in which students are allowed to take AP coursework. Attewell (2001) found that students in highly-acclaimed high schools were often less likely to take AP courses than students with comparable standardized test scores at less prestigious high schools, likely due to school leaders' fear that expanding participation in AP courses would lead to an unacceptable drop in scores. As a result, some schools hold students back, advising their second-tier students to take less rigorous courses, exercising grading scales and policies that distance the top students from the rest of the student population, and reserving AP courses for students who will be most likely to score very well on the AP exams.

AP enrollment is often regulated by gatekeepers, such as high test scores, grades in previous courses, teacher recommendations, and waivers from parents if students don't meet the prerequisites, indicating the school will not be responsible if the student struggles (National Research Council, 2002). The College Board (2002) noted that many schools have successfully expanded access to AP courses by eliminating pre-requisite courses and removing gatekeepers. Describing one district's initiatives to expand access to its AP program, Grier (2002) outlined several district-wide measures, including no longer requiring students to have letters of recommendation or GPA requirements to enroll. More recently, The Education Commission of the States (2008) highlighted actions taken by 13 states to encourage greater student access to AP courses.

Attracting More Students to AP Courses

Although school policies may be in place to allow students to enroll, students still must be compelled to enroll in the courses, with both the school and the individual student believing success will follow. Haycock (2001) explained how minority students in poverty-stricken areas often felt schools expected too little of them and that courses didn't challenge them. Turque (2008b) also reported that in low-performing schools, students felt as they were given busywork, allowed to flounder and fail, and not challenged with academic rigor. Attewell and Thurston (2008) noted the ongoing tradition of lower expectations for some students, and how this leads to a subtle form of discrimination.

Several research studies have demonstrated how black and Hispanic students are underrepresented in AP courses, while white and Asian students are overrepresented. In addition, schools with a higher proportion of minority students often offer fewer AP courses (Solórzano & Ornelas, 2002; Zarate & Pachon, 2006).

The College Board (2002) documented that schools have successfully expanded access to AP courses by recruiting students, often targeting underrepresented student groups. In addition to recruitment, districts may encourage student participation and success by paying the exam fee for students, or obtain outside funding to reward and recognize the students' accomplishments (Associated Press, 2008; Cech, 2008b; Grier, 2002; Singer-Vine, 2008; Turque 2008a).

Although there is a significant body of research documenting underrepresented populations in AP courses, many of these same factors apply to students regardless of

their ethnic background or household income. While this construct was initially created to focus on underrepresented populations taking the most rigorous courses, feedback obtained during the validation of the research questionnaire led to changing the focus of this construct to include a wider range of students. This construct will now explore how a more diverse student population can be attracted to AP courses and the willingness of schools to deal with issues that may arise.

Teachers' Adaptability and Commitment to AP Excellence and Expansion

Teachers play a critical role in which students take AP courses, either by recruiting students, encouraging capable students, or providing teacher recommendations. Wilkins (2006) examined differences in teacher perceptions about open access to AP courses, noting that regular-level teachers had the most restrictive perception on which students should be given access to AP courses. In each case, the AP teachers were more likely to believe that more students were able to challenge themselves with AP courses, believed in less restrictive entrance requirements, and saw the importance of differentiation in AP courses to meet various student needs. Those most directly linked to the AP courses saw the opportunities for more students to enroll in these courses.

The Education Trust (2005) documented the characteristics and practices of schools that effectively improved the academic achievement of previously low-performing students, finding more success in schools when teachers embraced the value of external standards, and focused on their students' achievement of the standards. Likewise, Paek et al. (2007) analyzed the relationship between teacher practices in AP U.S. History and AP Biology and student success on AP exams. They concluded that

students performed better when teachers found the AP Exam topics and rubrics influential in teaching their course.

Expecting and Ensuring Success for Students in AP Courses

Among the recommendations in its 2002 report, the College Board highlighted the importance of providing special study sessions for students and providing ongoing professional development for teachers. Researchers have documented that more students can tackle a rigorous curriculum when schools expect success and put systems in place to support both teachers and students (ACT & The Education Trust, 2005; Chenoweth, 2007; Grier, 2002). Schools must be aware that there are disparities in home structure for at-risk minority students compared to white and Asian students. These differences should not be used as an excuse for why schools can't educate all students, but rather to understand the additional support necessary for some students to excel (Ferguson, 2007; Steptoe, 2004).

Teacher professional development is also essential to success. In its 4th Annual AP Report to the Nation (2008a), the College Board highlighted twenty states that have taken measures to facilitate and fund professional development activities for teachers of both AP and pre-AP courses. Paek et al. (2007) analyzed the relationship between teacher practices and student success on AP exams, citing the importance of professional development and an emphasis on higher-order thinking skills.

Rationale for the Research

The current study will analyze school practices, attempting to understand the relationship between principals' personal beliefs and perceptions of school practices with successful AP participation. Educational leaders' beliefs and practices are related, but it is not always clear which comes first. Do educators' beliefs about students' ability drive the practices they implement, or do their beliefs sometimes change following implementation of practices and policies (Foord, 2008; Pfeffer & Sutton, 2000)?

Although schools serve different populations based on demographics and incoming student ability, these differences account for only some of the variation in AP participation levels. School personnel and policies have considerable control over the participation and success in rigorous courses. School leaders are faced with an important decision: Will we consign some students to a lesser curriculum, allowing them to fall farther behind their peers, or will we equip all students with the skills they need to tackle rigorous courses, ameliorating some of the current disparities? This research will quantify these differences and look for patterns that emerge in why some schools seem to provide more students with an opportunity to pursue and successfully complete rigorous coursework.

School leaders have a responsibility to set the tone for their schools, shaping the principles that guide decisions for teachers and students. Many leaders profess that all students can learn. Moral leadership serves these values and ideals, believing not only that all students can learn, but also that all students must learn. By coming to a more complete understanding of the relationship between leaders' personal beliefs and student

success, this study will contribute to the literature about the ways leaders provide opportunities for all students to learn to their full potential.

Summary

This chapter outlined the literature related to the current state of high school education in the United States, including the vast literature dealing with the importance of rigorous courses for students' growth and development. Numerous options for rigorous courses were presented, including options for college-level coursework in high school such as AP, IB, and dual-credit courses. Various school practices were examined that impact students' exposure to these most-rigorous courses, and schools were highlighted that have been successful in reaching diverse student populations. Finally, the rationale for the current study, and the literature used for construct development were presented.

CHAPTER III

METHODOLOGY

The literature is replete with evidence that rigorous coursework is the strongest predictor of college success (ACT, 2005; ACT, 2007; Adelman, 1999; Adelman, 2006; Florida Department of Education, 2005; Matthews, 2005; Matthews, 2008c; Matthews, 2007b; Riley, 2006; U.S. Department of Education, 2000). However, students do not enter high school with the same academic backgrounds, nor are they necessarily all afforded the same opportunities in different schools. Since high schools follow different placement policies and philosophies, students do not necessarily have the same opportunities at all high schools. Tracking decisions that are made as students enter high school, as well as students' options to try various course offerings reflect the school's beliefs about students' ability. These beliefs and practices play a role in students' prospects of tackling rigorous coursework during their high school years.

Purpose of the Study

The purpose of this study is to explore statistical relationships between principals' personal beliefs and perceptions of school practices regarding access to rigorous coursework, and the AP Equity and Excellence Score.

Research Questions

This study will seek to answer the following research questions:

1. What is the relationship between the AP Equity and Excellence Score and principals' personal beliefs in the following research constructs related to AP experience?
2. What is the relationship between the AP Equity and Excellence Score and principals' perceptions of their school's practices in the following research constructs related to AP experience?
    - Value of AP Coursework and Communicating That Value to Stakeholders
    - General Course Offerings
    - AP Placement Policies—Open vs. Limited Access
    - Attracting More Students to AP Courses
    - Teachers' Adaptability and Commitment to AP Expansion
    - Expecting and Ensuring Success for Students in AP Courses

Hypotheses

The following hypotheses will be tested:

1. There is a statistical relationship between principals' personal beliefs in the research constructs and the school's AP Equity and Excellence Score.
2. There is a statistical relationship between principals' perceptions of their schools' practices in the research constructs and the school's AP Equity and Excellence Score.

Design

The study will be a non-experimental design, employing a survey approach and using a self-administered questionnaire. It will involve cross-sectional data collection, with all of the responses being collected within approximately one month. Responses will be tracked to determine the number of participants contacted and the actual number of those who complete the questionnaire. Further, the survey methodology allows data collection from a large number of school leaders in a relatively short period of time. Since this is a non-experimental design, no causal inferences are warranted. However, the research will attempt to measure relationships between personal beliefs and perceptions of school practices with student participation and performance in the AP program.

The survey design will be used to collect data from a sample of school leaders, allowing inferences to be made about personal beliefs and school practices that can be generalized to the rest of the population of schools. Further, the survey design allows for rapid, economical data collection from a sample of the population, allowing the researcher to identify attributes of the entire population (Babbie, 1990).

Population and Sample

The population for this research is all of the high schools in the United States with AP programs. To gather data about principals' personal beliefs and perceptions of practice, a single-stage convenience sample of representative schools will be used. This research will be conducted with principals of 88 schools belonging to the Chicago Area Directors of Curriculum and Assessment (CADCA); based on return rate, this study could involve up to 88 high school principals. The CADCA schools were chosen because

of the established relationship of trust and sharing, and comparisons between member schools are often made. With the diverse makeup of schools represented, the results will be generalized to the greater educational community about existing policies and perceptions regarding AP participation.

CADCA brings school leaders together to routinely meet and share school improvement ideas and progress. These school leaders discuss ideas and findings with the rest of the group, establishing a means by which best practices can be shared. In addition, data are routinely collected for these schools in the suburbs of Chicago. A recent report to the CADCA group examined its member schools' 2006 AP success. The report provided each school's number of AP qualifying scores (3, 4, or 5 on the AP exam) received per 100 students in the school. The results demonstrated a wide-range in AP success, ranging from 2.8 to 62.0 qualifying scores per 100 students (Cordogan, 2006). A subsequent comparison was done in response to Newsweek magazine's annual ranking of public high schools. This report used the College Board's Equity and Excellence score, indicating the percentage of a school's graduates that had at least one score of 3, 4, or 5 on an AP exam (College Board, 2008a; Cordogan, 2008). The current research study will explore statistical relationships between the principals' personal beliefs and perceptions of school practice regarding access to rigorous coursework, and the AP Equity and Excellence Score.

Klopfenstein and Thomas (2005) noted the challenge posed to small high schools when they are mandated to offer AP courses, often without the specialization and training to teach these challenging courses. The CADCA schools in this study were chosen

because they are large suburban high schools with faculties large enough to possess highly qualified teachers who can specialize and focus on a particular course within their discipline. In addition, the larger student enrollments allow numerous AP courses to be offered. Therefore, this is not as significant a factor as it is for small high schools.

Instrument

Since a questionnaire of this nature did not exist, the researcher developed a new instrument for the purposes of this study (see Appendix D). The questionnaire was constructed using items directed at elucidating the personal beliefs and perceptions of school practices surrounding the six research constructs outlined below.

The instrument uses a Likert scale to measure participants' responses to the questionnaire items. Each statement has seven possible responses, with anchor points of strongly disagree and strongly agree. The questionnaire is arranged and will be analyzed in such a way that higher numerical values indicate beliefs and perceptions that remove barriers to student participation in more rigorous courses and prepare students to be successful. Lower scores indicate a structure that reserves these courses for a select few of the brightest students or that don't provide complete preparation for a successful experience. To maintain balance and clarity, some questionnaire items are scaled in reverse, with the "strongly disagree" response related to beliefs and perceptions that remove barriers for students or fully prepare them for success. The statements are organized into six constructs reflecting the literature on issues related to students having access to, and success in, AP coursework. Within each of these constructs, questionnaire items have been separated into "Your Personal Beliefs" and "Your School's Practices,"

allowing an analysis of the degree to which school practices match the beliefs of the school's leader. A Belief Scale and Practices Scale will be calculated for each construct by adding the total score for the related items. The following six constructs will be explored in this research. These constructs were developed from a review of the literature related to AP coursework and student placement.

1. *Value of AP Coursework and Communicating that Value to Stakeholders* addresses the importance of the AP program to a school and how this value is made known to faculty, students, and parents.

2. *General Course Offerings* refers to courses other than the AP courses in a school. This includes both rigorous courses that prepare students for the challenges of AP courses, as well as lower-level courses targeted at students not believed to be preparing for college.

3. *AP Placement Policies—Open vs. Limited Access* examines the degree to which the opportunity to take AP courses is open for all students, regardless of track placement in earlier high school years.

4. *Attracting More Students to AP Courses* refers to a school's active recruitment and incentives to bring more students into AP courses, as well as their willingness to accept potential ramifications of this practice, including potentially lower AP scores.

5. *Teachers' Adaptability and Commitment to AP Excellence and Expansion* refers to the critical role teachers' play in drawing students into AP courses, varying their instructional approaches to ensure success, and striving to help all students be successful in the AP courses and exams.

6. *Expecting and Ensuring Success for Students in AP Courses* addresses the degree to which principals believe students will be successful if they enroll in an AP course. This also considers the measures the school has taken to ensure student success, including professional development for both teachers and administrators.

An initial version of the questionnaire was distributed to 72 educators familiar with AP coursework for their review, with 21 questionnaires returned to the researcher. This process provided an assessment of the time needed to complete the questionnaire, clarification of the existing questionnaire items, and elimination of items that were deemed unnecessary. In addition, it led to the final arrangement of the questionnaire items into the six constructs noted above.

Following this initial pilot test of the instrument, four experts reviewed the questionnaire for content validity. These reviewers were either researchers or experienced practitioners in the field of AP coursework and student placement. The reviewers rated each questionnaire item for clarity and quality, as well as the degree to which it measured the construct in which it was placed. The feedback of these experts led to additional refinement and revisions of the questionnaire. The revisions included simplifying, eliminating, and adding items to more clearly measure the constructs of the study. In addition, two of the constructs were renamed to more clearly represent the existing literature and the questionnaire items in the construct. Finally, two additional AP experts evaluated the revised questionnaire for item clarity and quality, and the degree to which items matched the research constructs.

To ensure test-retest reliability, the instrument will be administered to approximately 15 educators not included in the CADCA research study group. This process will occur concurrently with the research study. These educators will complete the questionnaire two times, with approximately 14 days between each administration. Using these two questionnaires from each participant, test-retest reliability will be calculated by correlating the Beliefs Scale score in each of the six research constructs from the first questionnaire to the second questionnaire. Test-retest reliability will be calculated in the same way for the Practices Scale for each of the six research constructs. These correlation statistics will be presented in Chapter IV.

The final portion of the questionnaire will include an area for the principal to provide information regarding the length of his or her tenure in the school, both as an employee and as the principal. This information will be reviewed during data analysis, understanding that the principal's personal beliefs and values will exert a stronger influence and become more apparent in the school's practices with more years of leadership in the school.

Procedures

The school principals' names will be ascertained using the website of each high school belonging to CADCA. The questionnaire administration will follow a four-phase process as outlined in Creswell (2003). In the first phase, the researcher will notify each principal of the study by both voice mail message (see Appendix A) and email (see Appendix B), explaining the research study, inviting them to participate in the research, and indicating that the questionnaire will be arriving in approximately one week. The

information will provide a brief overview of the research study, as well as describing what information will be requested. The e-mail will be carbon copied to the principals' administrative assistant when possible.

The second phase will occur approximately one week following the initial e-mail, and will include a mailed consent form (see Appendix C), a questionnaire (see Appendix D), and a preaddressed envelope in which the principal will return the research materials. In the recruitment process, principals will be told the purpose of the study and be given a brief description of the questionnaire they will be asked to complete.

The third phase will consist of an email (see Appendix E) to the principals in the study sample, either thanking them for their participation, or requesting they return the questionnaire at their earliest convenience. This will occur approximately 10 days following the receipt of the questionnaire. Again, this e-mail will be carbon copied to the principals' administrative assistant when possible.

The fourth and final mailing will be specifically directed to principals who have not yet responded. This mailing will consist of a cover letter (see Appendix F), a consent form (see Appendix C), a second copy of the questionnaire (see Appendix D), and another preaddressed return envelope.

Since the principal is the leader of the building, completing and returning the consent form and questionnaire will be the process used to gain consent to participate in the study. This methodology will allow data collection to occur in a relatively short period of time.

Collection of Equity and Excellence Data

The Equity and Excellence Score for each school will be obtained from the College Board. This will be done in accordance with a license agreement between the researcher and the College Board (see Appendix G), ensuring confidentiality for each school involved in the research study. Acquiring the data from the College Board also ensures accuracy in the Equity and Excellence Scores.

Collection of Demographic Data

The schools included in the current study serve different student populations. To account for a portion of this variability, demographic data will be collected for each school. While the primary means of data collection will be accomplished using the questionnaire described above, demographic data will be obtained from the Illinois School Board's 2009 report card for each school at the following website: http://iirc.niu.edu/.

Two factors consistently cited as influencing student achievement are the racioethnic background and family income of students (Adelman, 2006; Cordogan, 2006; Klopfenstein, 2004). The School Report Card for each school contains data for both the percentage of students who are low-income, as well as the percentage of minority students who are from racioethnic groups often considered to be at-risk for lower school achievement: African American, Hispanic, and Native American. Adelman (2006) noted these two factors to be significant in predicting student achievement, with the influence of each variable approximately the same.

For this study, the researcher will utilize a spreadsheet to record the percentage of each school's students who are identified as low-income. The spreadsheet will also contain the combined percentage of minority students that are African American, Hispanic, or Native American. To determine the contribution of these factors to the AP Equity and Excellence Score for each school, the percentage of students identified as low-income and the percentage of minority students will be utilized during data analysis, which is congruent with Cordogan's (2006) previous reports to the CADCA schools. In addition, the U.S. News and World Report review of American high schools uses these variables in determining how well schools are performing (Morse, 2007). Analysis of the demographic data will be done prior to constructing regression models with the research constructs. This will allow a clear analysis of the impact of the research constructs on the AP Equity and Excellence Score. Other options for analyzing the demographic data will be explored to determine the contributions of each factor to the schools' AP Equity and Excellence Score.

Data Analysis

The research data will be used to explore relationships and draw preliminary correlations between beliefs and practices within and between research constructs. The data will be analyzed using the Statistical Package for the Social Sciences (SPSS).

To conduct the data analysis, descriptive statistics such as means, standard deviations, and ranges will be calculated for the questionnaire items and research constructs. In addition, the participants' total score for each construct will be calculated to generate a Belief Scale and a Practices Scale.

Student demographics are known to affect student achievement. During the data analysis, the variables of low-income students and minority students will be controlled. This will be done with each demographic variable independently to determine their contribution to the regression equation and to the AP Equity and Excellence Score.

The primary means of data analysis will be multiple regression analysis, correlating the participant's score on each construct to the AP Equity and Excellence Score for the 2009 graduating class. This analysis will determine the unique contributions of each independent variable to the AP Equity and Excellence Score. In addition, the percentage of a school's students that are identified as low-income or minority will be included as additional independent variables, determining the contribution to the AP Equity and Excellence Score.

A semi-partial correlation between the principals' Belief Scale on each research construct and the AP Equity and Excellence Score will be calculated. A semi-partial correlation will also be calculated between the Practices Scale on each research construct and the AP Equity and Excellence Score. This will be done to determine the individual contribution of each construct to the variance in Equity and Excellence Scores. Upon determining the individual contribution of each research construct, the researcher will engage in regression modeling based on the semi-partial correlations, review of literature, and theoretical framework. In addition, the researcher will generate a multiple regression model for principals' beliefs to answer the first research question, and a multiple regression equation on principals' perceptions of school practices to answer the second research question. Depending on the research results, further data analysis will explore

specific regression models to determine the ability of the equations to predict the impact of beliefs and perceptions on the AP Equity and Excellence Score.

Risks and Rewards for Participants

Participants in the research study will not be compensated in any way. The researcher will make the research findings available to any participant who requests to receive them.

There are no known risks to the participants. Only the principal investigator will have access to the raw data. The school principal's responses will be linked to the school's AP Equity and Excellence Score for data analysis. However, the identity of all respondents will be kept strictly confidential. Further, the principals' connection to the individual school's data will be for analysis only, and no identifying information will be presented in the results of the study. Data from the schools will be aggregated, with no discernible connections included in the report between the school and the AP Equity and Excellence Score. Any necessary references to individual schools or groups of schools will be done using a pseudonym for the school. The consent forms and questionnaires will be stored in two different locked file cabinets in the researcher's office. These original forms will be destroyed one year following the final defense and approval of the dissertation.

Significance of the Study

This study is critical in understanding a major component of equity and access for all public high school students. The data will link principals' personal beliefs and perceptions of school practices with the school's AP Equity and Excellence Score.

Although there are demographic differences and incoming student ability differences in the schools, these differences account for only some of the variation in AP participation and success. School personnel and policies have considerable control over the participation and success rates in rigorous courses. This research will quantify these differences and look for patterns that emerge in why some schools provide more students an opportunity to successfully complete rigorous coursework. Further, the study will examine if this relationship arises because schools that provide greater numbers of students a successful AP experience have leadership that believes AP coursework is valuable for large segments of the school population, have implemented policies to include greater numbers of students in the experience, and have implemented and supported practices that prepare students for the rigorous experience.

Many researchers have addressed student placement in American high schools, including the widespread use of tracking, the ways in which students are placed into courses, and the need for educators to be aware of the effects on students (George & Rubin, 1992; Hallinan, 1994; Jackson 2008; Lucas 1999; Oakes, 2005; Oakes, 1995; Oakes & Guiton, 1990; Westchester Institute, 2002). Further, researchers have outlined the need for schools to remove gatekeepers to AP courses (College Board, 2002; Education Commission of the States, 2008; Grier, 2002). Researchers have also documented that more students can tackle a rigorous curriculum when schools expect success and put systems in place to support both teachers and students (ACT & The Education Trust, 2005; Burris & Garrity, 2008; Chenoweth, 2007; Garrity, 2004; Grier, 2002; Haycock, 2001).

However, there has not been a close examination of the relationship between educational leaders' personal beliefs and the opportunities for students to successfully complete AP coursework. While other researchers have analyzed educators' perceptions on student placement and opportunities (George & Rubin, 1992; Oakes & Guiton, 1995; Wilkins, 2006), there are gaps in the literature that will be closed by the current study. First, the existing literature analyzed teacher responses, but the current study will measure the responses of school principals, a group often responsible for establishing school placement policies that guide students in their course selection. Second, the current study will specifically quantify and relate these beliefs and perceptions to how many students are successfully tackling challenging AP coursework. This research will link equity in achievement to principals' personal beliefs and perceptions of school practices about the opportunities for students to be placed in rigorous courses.

Limitations

There will be limitations to the ability to generalize study results to other schools. First, this study will only include relatively large suburban schools, and the sample size will be limited to the principals from the schools that respond to the questionnaire. Second, although there is diversity in the student populations served by these schools, it does not necessarily represent the diversity found throughout the United States. There are also limitations in comparing between the CADCA schools. The communities served by each school and the student population must be considered. The demographic and socioeconomic makeup of each school likely has an influence on AP participation and success. Incoming performance levels of students will also have an impact on the number

of students who are pursuing the most rigorous coursework. For these reasons, there may be some challenges in generalizing to the educational community as a whole.

Anticipated Ethical Issues

Participation in the survey will be completely voluntary. Respondents will not be compensated in any way, nor will they be individually identified as having responded or not. Further the identity of each school and participant will be protected, with a pseudonym used when appropriate.

The researcher is an employee at one of the CADCA member schools. However, the researcher has no supervisory capacity over the principal or the school's AP program. For this reason, the principal will be free to answer questionnaire items honestly and without fear of repercussions. Further, the principal is unfamiliar with the development of the research constructs and the research instrument that will be used in this study. No students will be tested, contacted, or identified in the course of this research.

Finally, these data must be interpreted with discretion. AP performance is only one of many ways to measure school quality. There are many differences that affect the achievement levels in the CADCA schools. As a result, readers of this research should not make hasty judgments about the quality of education or the personnel at any of these schools.

Summary

This chapter outlined the methodology that will be used in this research study, including the details of developing a new questionnaire, recruitment of participants, procedures for maintaining data security, and analysis of data.

Six constructs were developed from a review of literature surrounding student placement practices in American schools that lead to students' having the opportunity to successfully complete AP coursework. The research study will involve school principals completing a questionnaire, asking for personal beliefs and practices as they relate to six research constructs. The researcher will use multiple regression analysis to explore the relationship between responses in these constructs and the AP Equity and Excellence Score.

CHAPTER IV

ANALYSIS OF DATA AND FINDINGS

Overview

The purpose of this study was to explore statistical relationships between principals' personal beliefs and perceptions of school practices regarding access to rigorous coursework, and the AP Equity and Excellence Score. The study was designed to assess these beliefs and practices in six research constructs. This chapter will provide information regarding the process used for data collection and the statistical analyses used to answer each research question.

Research Questions

This study attempted to answer the following research questions:

1. What is the relationship between the AP Equity and Excellence Score and principals' personal beliefs in the following research constructs related to AP experience?
2. What is the relationship between the AP Equity and Excellence Score and principals' perceptions of their school's practices in the following research constructs related to AP experience?
    - Value of AP Coursework and Communicating That Value to Stakeholders
    - General Course Offerings
    - AP Placement Policies—Open vs. Limited Access

- Attracting More Students to AP Courses
- Teachers' Adaptability and Commitment to AP Expansion
- Expecting and Ensuring Success for Students in AP Courses

Hypotheses

The following hypotheses were tested:

1. There is a statistical relationship between principals' personal beliefs in the research constructs and the school's AP Equity and Excellence Score.
2. There is a statistical relationship between principals' perceptions of their schools' practices in the research constructs and the school's AP Equity and Excellence Score.

Description of Instrument

Since a questionnaire of this nature did not exist, the researcher developed a new instrument for the purposes of this study (see Appendix D). The instrument used a Likert scale to measure participants' responses to the questionnaire items. Each statement had seven possible responses, with anchor points of strongly disagree and strongly agree. The questionnaire was arranged and analyzed in such a way that higher numerical values indicated beliefs and perceptions that remove barriers to student participation in more rigorous courses and prepare students to be successful. Lower scores indicated a structure that reserves these courses for a select few of the brightest students or that don't provide complete preparation for a successful experience. To maintain balance and clarity, some questionnaire items were scaled in reverse, with the "strongly disagree" response related to beliefs and perceptions that remove barriers for students or fully prepare them for

success. The statements were organized into six constructs reflecting the literature on issues related to students having access to, and success in, AP coursework. Within each of the constructs, questionnaire items were separated into "Your Personal Beliefs" and "Your School's Practices." For each research construct, scores were added together to generate a score for the Belief Scale and the Practices Scale. For a detailed description of instrument construction, see Chapter II, "Research Construct Development" and Chapter III, "Instrument."

Validity

Instrument content validity was established by consulting experts in the field of AP coursework. An initial version of the questionnaire was distributed to 72 educators familiar with AP coursework for their review, with 21 questionnaires returned to the researcher. Following this initial pilot test of the instrument, four experts reviewed the questionnaire for content validity. These reviewers were either researchers or experienced practitioners in the field of AP coursework and student placement. Finally, two additional AP experts evaluated the revised questionnaire for item clarity and quality, and the degree to which items matched the research constructs. For a more thorough description of the validation of the instrument, see Chapter III, "Instrument."

Test-Retest Reliability

To ensure test-retest reliability, the instrument was administered to fifteen high school administrators not included in the Chicago Area Directors of Curriculum and Assessment (CADCA) research study group. This process occurred concurrently with the research study. These educators completed the questionnaire two times, with 21 days

between each administration. Using these two questionnaires from each participant, correlation coefficients were computed for the Belief Scale in each of the six research constructs, and the Practices Scale in each of the six research constructs. The data in Table 1 indicate a strong correlation between the responses recorded on the first administration of the questionnaire with the second administration that occurred 21 days later. The correlation values indicate a strong level of reliability and are consistent with the use of the instrument for research purposes. On the Belief Scale, the correlation values ranged from $r = .52$ to $r = .94$, with an average $r = .79$. Two of the six correlation coefficients were $r < .80$, which could be a limitation to research results and contribute to instrument error. On the Practices Scale, the correlation values ranged from $r = .53$ to $r = .81$, with an average $r = .65$. Four of the six correlation coefficients were $r < .80$, which could be a limitation to research results and contribute to instrument error. These values could be attributed to, in part, the relatively small size of the test group as well as the degree to which they are familiar with their school's AP program.

Summary of Data Collection

The questionnaire (see Appendix D—"Principals' Beliefs and Perceptions of School Practice About AP Coursework and Student Placement") was sent to 88 principals of high schools affiliated with the Chicago Area Directors of Curriculum and Assessment (CADCA). Of the principals contacted, 64 returned the questionnaire and consent form for a return rate of 73%.

Table 1

Test-Retest Reliability: Correlations for Belief Scales and Practices Scales in Each Research Construct

Scale	**Construct**	***r***
Belief	Value of AP Coursework and Communicating that Value to Stakeholders	.76
	General Course Offerings	.83
	AP Placement Policies: Open vs. Limited Access	.94
	Attracting More Students to AP Courses	.85
	Teachers' Adaptability & Commitment to AP Excellence and Expansion	.52
	Expecting and Ensuring Success for Students in AP Courses	.82
	Average Correlation for Belief Scales	**.79**
Practice	Value of AP Coursework and Communicating that Value to Stakeholders	.53
	General Course Offerings	.81
	AP Placement Policies: Open vs. Limited Access	.56
	Attracting More Students to AP Courses	.60
	Teachers' Adaptability & Commitment to AP Excellence and Expansion	.57
	Expecting and Ensuring Success for Students in AP Courses	.80
	Average Correlation for Practices Scales	**.65**

The Equity and Excellence Score for each school was obtained from the College Board in the form of an Excel spreadsheet. These data were shared in accordance with a license agreement between the researcher and the College Board (Appendix G), ensuring confidentiality for each school involved in the research study. After obtaining the Equity and Excellence data, it was noted that three of the schools had Equity and Excellence scores that were significantly different than previous self-reported data (Cordogan, 2006). Based on a review of the data from the College Board, it was clear that the scores of 100%, 0%, and 58.4% from these three schools were due to incorrect school enrollment data provided to the College Board. These schools were not included in the data analysis,

since their scores would have produced outliers and compromised the accuracy of the data. Removing these three schools from the study resulted in using the data from 61 schools used for the statistical analysis.

On the questionnaire, the principals reported the length of their tenure at their current high school, both as the principal and as an employee. The average time served as the principal of the current school was 4.0 years, and the total length of employment in the current school was 8.2 years. Table 2 groups the principals according to years served at their current school. There were 36 principals in the group whose tenure as the principal of their current school was only one to three years. Forty-one principals have been employed in their current school for at least four years, with 20 of them employed more than 10 years. Although these data indicate many principals are relatively new to their role as the principal of their current school, the length of their employment in the school results in their ability to accurately reflect the school's practices.

Table 2

Years Principals Have Worked in Current School

Number of principals serving:	Principal of Current School	Employee of Current School
1-3 years	36	20
4-6 years	13	11
7-9 years	11	10
≥10 years	1	20
Total	61	61

Demographic data were collected for each school from the Illinois School Board's 2009 report cards at the following website: http://iirc.niu.edu/. These data included the low-income rate and a combined percentage of minority students. The percentage of

minority students was derived by adding the percentages of African American, Hispanic, and Native American students. These student groups are often considered to be at-risk racioethnic groups (Adelman, 2006; Cordogan, 2006; Klopfenstein, 2004).

Data Analysis

The Statistical Package for the Social Sciences (SPSS) 17.0 software was used for data analysis. Scores for each question were recorded individually, and totals were calculated for the Belief Scale and Practices Scale for each of the six research constructs.

Research Question #1: What is the relationship between the AP Equity and Excellence Score and principals' personal beliefs in the six research constructs related to AP experience?

To answer the first research question, a multiple regression analysis was conducted to evaluate how well the Belief Scales predicted the Equity and Excellence Score. The predictors were the scores on the Belief Scales in each of the six research constructs, generated from the total score from items on "Your Personal Beliefs." The criterion variable was the Equity and Excellence Score for each school provided by the College Board. The linear combination of these variables was not significantly related to the Equity and Excellence Score, $F(6, 54) = 1.11$, $p = .37$. The sample multiple correlation coefficient was $R = .33$, and $R^2 = .11$, indicating that approximately 11% of the variance on the Equity and Excellence Score can be accounted for by the linear combination of these measures. The correlation values (r) for each predictor are presented in Table 3. The correlation value for the AP Placement Policies Belief Scale was significant ($p < .05$). None of the partial correlation coefficients were significant,

although the partial correlation coefficient for the AP Placement Policies Belief Scale was approaching significance at $p = .08$.

Table 3

Multiple Regression Analysis of Belief Scales on Equity and Excellence Score

Belief Scale Predictor	Correlation (*r*) with Equity & Excellence Score	Partial Correlation with Equity & Excellence Score, controlling for other predictors
Value of AP Coursework and Communicating That Value	.18	.07
General Course Offerings	.01	-.13
AP Placement Policies	.26*	.24
Attracting More Students	.19	.13
Teachers' Adaptability and Commitment	.07	-.03
Expecting and Ensuring Success	.02	-.10

*p < .05

Since the Belief Scales alone did not significantly explain the variance in Equity and Excellence scores, the same multiple regression analysis was conducted with the addition of the two demographic variables of low-income students and minority students. The criterion variable was the Equity and Excellence Score for each school. The predictor variables were the scores on the six Belief Scales, and the percentages of low-income and minority students. The linear combination of these variables was significantly related to the Equity and Excellence Score, $F(8, 52) = 5.36$, $p < .01$. The sample multiple correlation coefficient was $R = .67$ and $R^2 = .45$, indicating that approximately 45% of the variance on the Equity and Excellence Score can be accounted for by the linear combination of these measures.

The correlation values (r) between each predictor and the AP Equity and Excellence Score are presented in Table 4. As expected, the bivariate correlations for the demographic variables were negative, indicating that as the population of low-income and minority students increased, the expected Equity and Excellence Score declined. Both of the demographic variables were significant ($p < .01$) as well as the AP Placement Policies Belief Scale ($p < .05$). None of the partial correlations were significant. Judgments about the relative importance of these predictors are difficult because they are correlated with one another. However, the partial correlations for the AP Placement Policies Belief Scale and the Attracting More Students Belief Scale were the highest values seen at $r = .18$ and $r = .11$, respectively.

To understand the contributions of the six Belief Scales over and above the demographic variables, additional multiple regression analyses were conducted. The first analysis included only the demographic variables of low-income and minority students. The model was significant, $R = .63$, $R^2 = .40$, $F(2, 58) = 19.211$, $p < .01$, again indicating that the demographic variables of low-income and minority students are significantly related to the Equity and Excellence Score. The model was also significant when the six Belief Scales were included in the model. Subsequent analyses evaluated the individual effects of the six Belief Scales to see if they changed the model significantly. Only the AP Placement Policies Belief Scale was statistically significant, R^2 change = .04, $F(1, 57) = 3.96$, $p = .05$, indicating a significant additive impact on the regression model. These results suggest that schools with principals whose beliefs indicate there should be more

open access to AP courses for all students tended to have a higher Equity and Excellence Score.

Table 4

Multiple Regression Analysis of the Effect of Demographic Variables and Belief Scales on Equity and Excellence Score

Predictor	Correlation (*r*) with Equity & Excellence Score	Partial Correlation with Equity & Excellence Score, controlling for other predictors
% Minority Students	-.61**	-.08
% Low-income Students	-.62**	-.23
Value of AP Coursework and Communicating That Value	.18	-.03
General Course Offerings	.01	-.04
AP Placement Policies	.26*	.18
Attracting More Students	.19	.11
Teachers' Adaptability and Commitment	.07	.03
Expecting and Ensuring Success	.02	.06

*p < .05; **p < .01

Research Question #2: What is the relationship between the AP Equity and Excellence Score and principals' perceptions of their school's practices in the six research constructs related to AP experience?

To answer the second research question, a multiple regression analysis was conducted to evaluate how well the principals' perceptions of school practices predicted the Equity and Excellence Score. The predictors were the scores on the Practices Scales in each of the six research constructs, generated from the total score from items on "Your School's Practices." The criterion variable was the Equity and Excellence Score for each school provided by the College Board. The linear combination of these variables was not

significantly related to the Equity and Excellence Score, $F(6, 54) = .66$, $p = .68$. The sample multiple correlation coefficient was $R = .26$ and $R^2 = .07$, indicating that approximately 7% of the variance on the Equity and Excellence Score can be accounted for by the linear combination of these measures. The correlation values (r) for each predictor are presented in Table 5. The correlation value for the General Course Offerings Practices Scale was significant ($p < .05$). The correlation values for the Teachers' Commitment to AP Excellence and Expansion Practices Scale, and the Expecting and Ensuring Success Practices Scale were approaching significance, each at $p = .06$. None of the partial correlation coefficients were significant.

Table 5

Multiple Regression Analysis of Practices Scales on Equity and Excellence Score

Practices Scale Predictor	Correlation (r) with Equity & Excellence Score	Partial Correlation with Equity & Excellence Score, controlling for other predictors
Value of AP Coursework and Communicating That Value	.17	.03
General Course Offerings	.23*	.12
AP Placement Policies	.15	-.05
Attracting More Students	.07	-.03
Teachers' Adaptability and Commitment	.20	.07
Expecting and Ensuring Success	.20	.07

*p < .05

Since the Practices Scales alone did not significantly explain the variance in Equity and Excellence scores, the same multiple regression analysis was conducted with the addition of the two demographic variables of low-income students and minority

students. The criterion variable was the Equity and Excellence Score for each school. The predictor variables were the scores on the six Practices Scales, and the percentages of low-income and minority students. The linear combination of these variables was significantly related to the Equity and Excellence Score, $F(8, 52) = 5.34$, $p < .01$. The sample multiple correlation coefficient was $R = .67$ and $R^2 = .45$, indicating that approximately 45% of the variance on the Equity and Excellence Score can be accounted for by the linear combination of these measures.

The correlation values (r) between each predictor and the AP Equity and Excellence Score are presented in Table 6. As noted above for research question #1, the bivariate correlations for the demographic variables were negative, indicating that as the population of low-income and minority students increased, the expected Equity and Excellence Score declined. Both of the demographic variables were significant ($p < .01$) as well as the General Course Offerings Practices Scale ($p < .05$). None of the partial correlations were significant. Judgments about the relative importance of these predictors are difficult because they are correlated with one another.

Table 6

Multiple Regression Analysis of the Effect of Demographic Variables and Practices Scales on the Equity and Excellence Score

Predictor	Correlation (*r*) with Equity & Excellence Score	Partial Correlation with Equity & Excellence Score, controlling for other predictors
% Minority Students	-.61**	-.16
% Low-income Students	-.62**	-.16
Value of AP Coursework and Communicating That Value	.17	-.18
General Course Offerings	.23*	.08
AP Placement Policies	.15	.11
Attracting More Students	.07	.08
Teachers' Adaptability and Commitment	.20	-.05
Expecting and Ensuring Success	.20	.15

*p < .05; **p < .01

To understand the contributions of the six Practices Scales over and above the demographic variables, additional multiple regression analyses were conducted. The first analysis included only the demographic variables of low-income and minority students. The model was significant, $R = .63$, $R^2 = .40$, $F(2, 58) = 19.211$, $p < .01$, again indicating that the demographic variables of low-income and minority students are significantly related to the Equity and Excellence Score. The multiple regression model was also significant when the six Practices Scales were included in the model. Subsequent analyses evaluated the individual effects of the six Practices Scales to see if they changed the model significantly. The only variable that approached statistical significance in changing the model was the Expecting and Ensuring Success Practices Scale, R^2 change

= .03, $F(1, 57) = 2.97$, $p = .09$. Although the p value for this analysis was not less than .05, it was approaching significance.

These results suggest that schools that offer rigorous (and less low-level) courses to all students throughout their high school careers are more likely to have a more students having a successful AP experience (high Equity and Excellence Score). In addition, schools are more likely to have a higher Equity and Excellence Score if they expect success and have practices in place to ensure success once students enroll in an AP course.

Exploratory Data Analysis

Due to the vast number of variables that can impact student achievement and the complex interactions between variables, a number of additional exploratory analyses were conducted.

Correlating Beliefs with Practices

When examining the principals' beliefs and schools' practices, we can consider whether the principals' beliefs match their perceptions of their schools' practices. To measure this, correlation coefficients were computed between the Belief Scale and the Practices Scale for each research construct. The values presented in Table 7 show that four of the six correlation coefficients were moderate, while two of the correlation coefficients were weak. In general, these results show that for four research constructs, principals' perceptions of their school's practices matched their personal beliefs.

Table 7

Correlations Between the Belief Scale and the Practices Scale in Each of the Six Research Constructs

Construct	*r*
Value of AP Coursework & Communicating that Value to Stakeholders	.50
General Course Offerings	.14
AP Placement Policies—Open vs. Limited Access	.10
Attracting More Students to AP Courses	.28
Teachers' Adaptability & Commitment to AP Excellence and Expansion	.48
Expecting and Ensuring Success for Students in AP Courses	.30

The fact that two of the six research constructs have a weak correlation between beliefs and practices could be attributed to several factors. First, it could indicate that the school has not yet implemented practices that reflect the principals' beliefs in the constructs of General Course Offerings, and AP Placement Policies. Second, it could be a reflection of the relatively high variability in the responses for both beliefs and practices in these two constructs. The mean score and standard deviation for items within each construct are presented in Table 8. (Although total scores for each research construct were used in the data analysis, the research constructs did not all contain equal numbers of questions. As a result mean scores for questions in each construct are shown here for consistency and comparisons between the constructs.)

Table 8

Mean Item Score and Standard Deviation for the Six Research Constructs

Construct	**Mean**	**SD**
Value of AP Coursework and Communicating that Value to Stakeholders—Beliefs	6.2	1.1
Value of AP Coursework and Communicating that Value to Stakeholders--Practices	5.1	1.5
General Course Offerings--Beliefs	5.3	1.6
General Course Offerings--Practices	5.0	1.6
AP Placement Policies: Open vs. Limited Access—Beliefs	5.1	1.5
AP Placement Policies: Open vs. Limited Access--Practices	5.4	1.5
Attracting More Students to AP Courses--Beliefs	5.7	1.3
Attracting More Students to AP Courses--Practices	4.6	1.8
Teachers' Adaptability & Commitment to AP Excellence and Expansion—Beliefs	5.0	1.4
Teachers' Adaptability & Commitment to AP Excellence and Expansion—Practices	5.2	1.3
Expecting and Ensuring Success for Students in AP Courses—Beliefs	5.8	1.1
Expecting and Ensuring Success for Students in AP Courses--Practices	5.2	1.4

Analysis of Responses to Individual Questions

Each item on the questionnaire was scaled from 1-7 based on responses ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). The questionnaire was arranged in such a way that higher numerical values indicated beliefs and perceptions that remove barriers to student participation in more rigorous courses and prepare students to be successful. Lower scores indicated a structure that reserves these courses for a select few of the brightest students or that don't provide complete preparation for a successful experience. To maintain balance and clarity, some questionnaire items were scaled in

reverse, with the "strongly disagree" response related to beliefs and perceptions that remove barriers for students or fully prepare them for success.

The mean score and standard deviation were calculated for each item. The overall mean score for questionnaire items was 5.3 (on a seven point scale). The average standard deviation for items was 1.4. Table 9 includes the ten items with the highest mean scores, indicating principals generally strongly agreed with these items. Each of these items had a higher than average score, and a lower than average standard deviation.

Table 9

Questionnaire Items with Highest Mean Scores

#	Questionnaire Item	Mean	SD
40	I believe AP teachers should use a variety of instructional approaches to accommodate different learning styles in our AP courses.	6.6	.7
2	Students benefit from the AP experience, even if they don't achieve a qualifying score on the AP exam (3, 4, or 5)	6.5	.9
5	If my child attended our high school, I would want him or her to take at least one AP course.	6.5	.9
14	I believe an AP teachers' course load should include teaching both AP and non-AP courses.	6.5	1.1
19	Our AP teachers also teach non-AP courses.	6.5	1.0
49	I believe AP teachers should be given specific professional development opportunities to increase their effectiveness.	6.5	.8
29	I think our school should actively explore options to increase participation in AP courses.	6.3	1.2
34	I think our school should actively recruit and encourage students from underrepresented populations to take AP courses.	6.3	1.1
55	Our school encourages and pays for teachers to attend AP meetings or other AP training.	6.3	1.2
24	I believe hard work is as important as high aptitude for a successful AP experience.	6.2	1.0

While the items in Table 9 indicated questions on which there was agreement between principals, there were other items that had greater variation in scores. The average standard deviation for all questionnaire items was 1.4. Table 10 includes the questionnaire items for "Your Personal Beliefs" with a standard deviation greater than or equal to 1.7, and Table 11 includes the questionnaire items for "Your School's Practices" with a standard deviation greater than or equal to 1.7. These items exhibited the greatest variability in principals' responses.

Table 10

Questionnaire Items for "Your Personal Beliefs" with Highest Standard Deviation

#	Questionnaire Item	Mean	SD
21	I think pre-requisite courses should play a large part in determining if a student is prepared to take an AP course (or courses leading to AP participation).*	3.7	2.0
11	In my opinion, low-level courses are necessary to accommodate the needs of our students.*	4.5	1.9
41	I think teachers in our school consider teaching AP courses as more important than teaching other courses.*	3.7	1.9
12	I believe low-level courses are necessary to provide our students a sense of success.*	5.2	1.7
13	I believe a college preparatory sequence should be the minimum standard academic program for our students.	5.1	1.7
31	I believe our school should prepare all of our students for college.	5.1	1.7
32	If we significantly increased the number of students in AP courses, I believe scores would suffer significantly.*	4.3	1.7
4	I believe our school should have specific, measurable goals about AP participation and success.**	6.1	1.3

*Indicates item was scaled in reverse

**Included due to nearly identical match with Item 6 from Practices in this construct.

Table 11

Questionnaire Items for "Your School's Practices" with Highest Standard Deviation

#	Questionnaire Item	Mean	SD
36	Our school uses federal funds and/or College Board AP Fee Reduction to allow students from low-income families to take AP exams at a reduced cost.	5.2	2.1
6	Our school has specific, measurable goals about AP participation as part of our mission, vision, and/or school values statement.	4.1	2.0
15	Our school has worked to eliminate low-level courses.	4.6	2.0
7	Our school effectively communicates our AP participation goals to our school's faculty.	4.7	1.9
37	Our students receive tangible incentives if they take an AP course and the AP exam.	2.8	1.9
28	We encourage students to take an AP class early in their high school career.	4.7	1.8
18	Our typical course sequence includes students' taking an AP course.	3.8	1.7
26	Our school has promoted specific AP courses that would allow greater numbers of students a successful initial experience with an AP course.	5.2	1.7
38	Our school closely monitors the percentage of students who have a successful AP experience (e.g. College Board's Equity and Excellence Score).	5.5	1.7
56	Our school supports administrators' training by offering professional development in how to manage and grow our AP program.	4.2	1.7

Analysis of Questionnaire Items for "Your Personal Beliefs" with Large Variability

To determine the relationship between these questions demonstrating wide variability in responses and the Equity and Excellence Score, additional multiple regression analyses were conducted. The goal of this analysis was to determine if the increased variability in responses helped predict the variability in the Equity and Excellence Score. The first regression included all questionnaire items in Table 10 as predictors. The demographic variables of low-income students and minority students

were also included due to their relationship to the Equity and Excellence Score (noted previously). The criterion variable was the Equity and Excellence Score for each school provided by the College Board. The linear combination of these variables was significantly related to the Equity and Excellence Score, $F(10, 50) = 5.37$, $p < .01$. The sample multiple correlation coefficient was $R = .72$ and $R^2 = .52$, indicating that approximately 52% of the variance on the Equity and Excellence Score can be accounted for by the linear combination of these measures.

The correlation values (r) for each predictor are presented in Table 12. The correlation value for both demographic variables and Item 32 were significant ($p < .01$), as well as Items 4 and 31 ($p < .05$). The partial correlation coefficient for Item 4 was significant ($p < .05$), and the partial correlation coefficient for Item 32 was approaching significance at $p = .09$.

To understand the contributions of each of these items over and above the demographic variables, additional multiple regression analyses were conducted. The first analysis included only the demographic variables of low-income and minority students. The model was significant, $R = .63$, $R^2 = .40$, $F(2, 58) = 19.21$, $p < .01$, indicating that the demographic variables are significantly related to the Equity and Excellence Score.

Subsequent analyses evaluated the individual effects of the items from Table 12 to see if they changed the model significantly. Three items had $p = .05$ when considering their impact on the regression model over and above the demographic variables. Item 4 impacted the regression with R^2 change = .04, $F(1, 57) = 4.01$, $p = .05$, Item 32 impacted the regression with R^2 change = .04, $F(1, 56) = 3.97$, $p = .05$, and Item 31 impacted the

regression with R^2 change = .04, $F(1, 55) = 3.93$, $p = .05$. As a result, these three items explained an additional 12% of the variance.

Table 12

Multiple Regression Analysis of Selected Items Related to Principals' Beliefs on Equity and Excellence Score

Predictor	Correlation (*r*) with Equity & Excellence Score	Partial Correlation with Equity & Excellence Score, controlling for other predictors
% Minority Students	-.62**	-.22
% Low-income Students	-.63**	.05
21. I think pre-requisite courses should play a large part in determining if a student is prepared to take an AP course (or courses leading to AP participation).	.11	.03
11. In my opinion, low-level courses are necessary to accommodate the needs of our students.	.04	-.01
41. I think teachers in our school consider teaching AP courses as more important than teaching other courses.	-.14	-.04
12. I believe low-level courses are necessary to provide our students a sense of success.	-.01	-.09
13. I believe a college preparatory sequence should be the minimum standard academic program for our students.	.07	.09
31. I believe our school should prepare <u>all</u> of our students for college.	.25*	.14
32. If we significantly increased the number of students in AP courses, I believe scores would suffer significantly.***	.35**	.24
4. I believe our school should have specific, measurable goals about AP participation and success.	.28*	.28*

*p < .05; **p < .01; ***Indicates item was scaled in reverse

These results suggest that schools tended to have a higher Equity and Excellence Score if the principal believes their schools should have measurable goals for AP participation and success, should prepare all of their students for college, and did not feel AP scores would suffer significantly if they significantly increased the number of students in AP courses.

Analysis of Questionnaire Items for "Your School's Practices" with Large Variability

To determine the relationship between these questions demonstrating wide variability in responses and the Equity and Excellence Score, additional multiple regression analyses were conducted. The goal of this analysis was to determine if the increased variability in responses helped predict the variability in the Equity and Excellence Score. This regression included the questionnaire items in Table 11 as predictors. The demographic variables of low-income students and minority students were also included due to their relationship to the Equity and Excellence Score (noted previously). The criterion variable was the Equity and Excellence Score for each school provided by the College Board. The linear combination of these variables was significantly related to the Equity and Excellence Score, $F(12, 48) = 4.62$, $p < .01$. The sample multiple correlation coefficient was $R = .73$ and $R^2 = .54$, indicating that approximately 54% of the variance on the Equity and Excellence Score can be accounted for by the linear combination of these measures.

The correlation values (r) for each predictor are presented in Table 13. The correlation value for both demographic variables and Item 18 were significant ($p < .01$). None of the partial correlation coefficients were significant. Items 15, 36, and 38 had

partial correlation values greater than $r = .20$, which were noticeably higher than the other items analyzed (see Table 13). In addition to these three items, Item 6 had a partial correlation of $r = -.21$, indicating an inverse relationship with the Equity and Excellence Score. Item 6 indicates the school practice of having specific, measurable goals about AP participation. This negative partial correlation is interesting in light of the analysis of Item 4 (see Table 12) that indicated a significant positive partial correlation of $r = .28$ ($p < .05$). Item 4 indicated degree to which principals believe their school should have measurable goals about AP participation and success.

To understand the contributions of each of these items over and above the demographic variables, additional multiple regression analyses were conducted. The first analysis included only the demographic variables of low-income and minority students. The regression model with the demographic variables alone was significant, $R = .63$, $R^2 = .40$, $F(2, 58) = 19.21$, $p < .01$, again indicating that the demographic variables of low-income and minority students were significantly related to the Equity and Excellence Score.

Additional analyses evaluated whether the responses to the individual items in Table 13 changed the regression model significantly. Three items had an effect that approached statistical significance. Item 15 impacted the regression with R^2 change = .03, $F(1, 57) = 2.86$, $p = .10$, Item 36 impacted the regression with R^2 change = .03, $F(1, 56) = 3.38$, $p = .07$, and Item 18 impacted the regression with R^2 change = .03, $F(1, 54) = 3.18$, $p = .08$. Although the p value for these analyses was not less than .05, they were near the cutoff of .05. These three items explained an additional 9% of the variance.

Table 13

Multiple Regression Analysis of Selected Items Related to School Practices on Equity and Excellence Score

Predictor	Correlation (*r*) with Equity & Excellence Score	Partial Correlation with Equity & Excellence Score, controlling for other predictors
% Minority Students	-.62**	-.03
% Low-income Students	-.63**	.14
36. Our school uses federal funds and/or College Board AP Fee Reduction to allow students from low-income families to take AP exams at a reduced cost.	.07	.21
6. Our school has specific, measurable goals about AP participation as part of our mission, vision, and/or school values statement.	.04	-.21
15. Our school has worked to eliminate low-level courses.	.14	.21
7. Our school effectively communicates our AP participation goals to our school's faculty.	.11	.03
37. Our students receive tangible incentives if they take an AP course and the AP exam.	-.09	-.18
28. We encourage students to take an AP class early in their high school career.	.08	.11
18. Our typical course sequence includes students' taking an AP course.	.45**	.21
26. Our school has promoted specific AP courses that would allow greater numbers of students a successful initial experience with an AP course.	.09	.02
38. Our school closely monitors the percentage of students who have a successful AP experience (e.g. College Board's Equity and Excellence Score).	.14	.18
56. Our school supports administrators' training by offering professional development in how to manage and grow our AP program.	.11	.00

*p < .05; **p < .01

These results suggest that schools tended to have a higher Equity and Excellence Score if the school has taken measures to eliminate low-level courses, uses federal and/or

College Board funds to allow low-income students to take AP exams, and have course sequencing that typically ends with students' taking an AP course.

Comparing Schools By Demographics and Equity and Excellence Scores

An additional analysis was conducted to determine if there were differences in questionnaire responses between principals of schools with higher Equity and Excellence Scores compared to schools with lower Equity and Excellence Scores. Whereas school demographics for previous analyses were conducted with the combined effects of minority population and low-income students, the single variable of percent minority population was chosen as the predictor variable (x-axis) for this analysis for three reasons. First, it allowed one variable to be used for the scatter plot, making the construction of the graph straightforward. Second, for the schools in this study, there was a strong correlation between the two demographic variables ($r = .92$, $p < .01$). Third, since the minority population is not a self-reported value, it avoids the possibility of under-identification that exists with the low-income designation for students.

To conduct this analysis, a scatter plot was created, with percent minority population on the x-axis, and Equity and Excellence Score on the y-axis. This scatter plot indicated 37 schools with less than 20% of their population comprised of at-risk racial groups (see Figure 2). While the current and previous research indicates demographic variables are correlated to student achievement, there were large differences in the Equity and Excellence Scores between schools with similar percent minority populations. Similarly, there were large differences in percent minority population between schools with similar Equity and Excellence Scores.

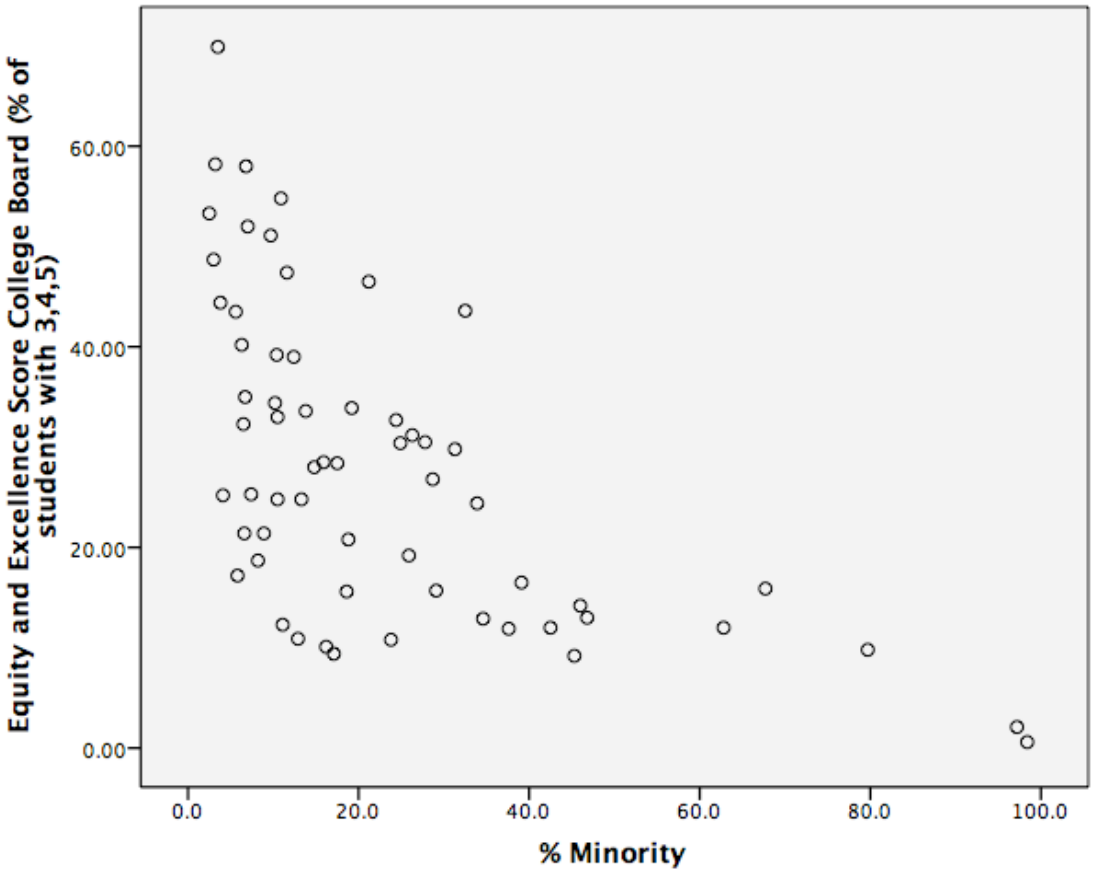


Figure 2. Scatter Plot of % Minority Population vs. Equity and Excellence Score

Clearly, there is a wide range of Equity and Excellence Scores between schools with low percentages of minority students. Table 14 highlights six schools that fall on the continuum of values for percent minority and Equity and Excellence Scores. For example, schools 1, 2, 3, and 4 educate less than 6% minority students, but the AP Equity and Excellence Scores range from 17 to 70. Likewise, there is a wide range for schools' percent minority population at the same Equity and Excellence Score. Schools 2 and 6 have an Equity and Excellence Score of approximately 45, but have minority populations of less than 6% and approximately 35%, respectively. Similarly, schools 1 and 5 have an

Equity and Excellence Score of 16-18%, but have minority populations of less than 6% and approximately 65%, respectively. Although Table 14 shows differences in the values from the questionnaire responses, no clear trends emerge. These schools indicate the need for further investigation with different methodological approaches. More in-depth analyses of these schools could indicate the influence of other demographic variables such as education level of parents, or a more complete understanding of the impact of beliefs and school practices. Recognizing that there are many methods by which to measure opportunities for equity and exposure to rigorous coursework in these schools, other variables must be considered to fully understand the degree to which these schools are providing equitable opportunities for all students to pursue, and succeed in, a rigorous curriculum.

Table 14

Comparison of Six Schools with Similar Demographics or Similar Equity and Excellence Scores

Scale	Descriptor	#1	#2	#3	#4	#5	#6
	% Minority Population*	< 6	< 6	< 6	< 6	~65	~35
	Equity and Excellence Score*	16-18	44-46	53-55	70	16-18	44-46
Belief	Value of AP Coursework	30	31	23	35	24	32
	General Course Offerings	18	26	20	28	28	26
	AP Placement Policies	18	22	21	35	23	24
	Attracting More Students	30	39	32	40	31	33
	Teachers' Adaptability & Commitment	20	17	15	27	21	15
	Expecting & Ensuring Success	22	24	24	28	19	26
Practice	Value of AP Coursework	24	27	11	35	23	17
	General Course Offerings	26	22	26	34	30	8
	AP Placement Policies	20	20	15	27	17	17
	Attracting More Students	20	13	10	20	20	21
	Teachers' Adaptability & Commitment	19	16	13	28	17	16
	Expecting & Ensuring Success	36	32	18	42	28	27

*Note: Imprecision in values is intentional to maintain anonymity of schools.

Summary

This chapter presented the results of multiple regression analyses between the research constructs and the Equity and Excellence Score. The data indicated that student demographics (percent minority and percent low-income students) were related to the Equity and Excellence Score. When analyzing the Belief Scales, the construct of "AP Placement Policies—Open vs. Limited Access" was significantly correlated with the Equity and Excellence Score, and was statistically significant over and above the demographic variables ($p = .05$). For the Practices Scales, "General Course Offerings"

was correlated to the Equity and Excellence Score ($p < .05$). When measuring the effects of the Practices Scales on the regression model over and above the demographic variables, only the construct of Expecting and Ensuring Success approached statistical significance ($p = .09$).

Exploratory data analyses were presented indicating the relationships between individual questionnaire items with high variability in responses and the Equity and Excellence Score. Three items related to principals' personal beliefs were significantly correlated to the Equity and Excellence Score. In addition, these three items demonstrated a significant effect on the regression model over and above the demographic variables ($p = .05$). For the individual items related to school practices, one item was significantly correlated to the Equity and Excellence Score. In addition, three questionnaire items approached statistical significance when comparing their impact on the regression model over and above the demographic variables.

Finally, differences between individual schools were noted that indicate the need for more in-depth research approaches. Schools were noted to be outliers when considering the scatter plot of Equity and Excellence Score vs. Percent Minority Population. These differences underscore the need for further investigation of individual schools, probing for additional indicators that affect students' opportunities to pursue rigorous coursework of all kinds.

Equity and Excellence Data:
Source: Derived from data provided by the College Board.

CHAPTER V

CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

Overview

This chapter provides a summary of the research procedures, a review of the findings from Chapter IV, and the connections between the current research and the related literature. In addition, implications for school leaders and recommendations for future research are presented.

Summary of Rationale and Research Procedures

The literature is replete with evidence that rigorous coursework is the strongest predictor of college success (ACT, 2005; ACT, 2007; Adelman, 1999; Adelman, 2006; Florida Department of Education, 2005; Matthews, 2005; Matthews, 2008c; Matthews, 2007b; Riley, 2006; U.S. Department of Education, 2000). However, students do not enter high school with the same academic backgrounds, nor are they necessarily all afforded the same opportunities in different schools. Student placement and tracking decisions that are made as students enter high school, as well as students' options to try various course offerings, reflect the school's beliefs about students' ability. These beliefs and practices play a role in students' prospects of tackling rigorous coursework during their high school years.

The purpose of this study was to explore statistical relationships between principals' personal beliefs and perceptions of school practices regarding access to

rigorous coursework, and the AP Equity and Excellence Score. The study was designed to assess these beliefs and practices in the following six research constructs.

- Value of AP Coursework and Communicating That Value to Stakeholders
- General Course Offerings
- AP Placement Policies—Open vs. Limited Access
- Attracting More Students to AP Courses
- Teachers' Adaptability and Commitment to AP Expansion
- Expecting and Ensuring Success for Students in AP Courses

This study is critical in understanding a major component of equity and access for all public high school students. The data linked principals' personal beliefs and perceptions of school practices with the school's AP Equity and Excellence Score. Although demographic differences exist between schools, these differences account for only some of the variation in AP participation and success. School personnel and policies have considerable control over the participation and success rates in rigorous courses. This research sought to quantify these differences and looked for patterns that emerged in why some schools provide more students an opportunity to successfully complete AP coursework.

Many researchers have addressed student placement in American high schools, including the widespread use of tracking, the ways in which students are placed into courses, and the need for educators to be aware of the effects on students (George & Rubin, 1992; Hallinan, 1994; Jackson 2008; Lucas 1999; Oakes, 2005; Oakes, 1995; Oakes & Guiton, 1990; Westchester Institute, 2002). Further, researchers have outlined

the need for schools to remove gatekeepers to AP courses (College Board, 2002; Education Commission of the States, 2008; Grier, 2002). Researchers have also documented that more students can tackle a rigorous curriculum when schools expect success and put systems in place to support both teachers and students (ACT & The Education Trust, 2005; Burris & Garrity, 2008; Chenoweth, 2007; Garrity, 2004; Grier, 2002; Haycock, 2001).

However, there had not been a close examination of the relationship between educational leaders' personal beliefs and the opportunities for students to successfully complete AP coursework. While other researchers have analyzed educators' perceptions on student placement and opportunities (George & Rubin, 1992; Oakes & Guiton, 1995; Wilkins, 2006), the current study closes gaps in the literature. First, the existing literature analyzed teacher responses, but the current study measured the responses of school principals, a group often responsible for establishing school placement policies that guide students in their course selection. Second, the current study specifically quantified these beliefs and perceptions of school practices regarding student placement into rigorous courses and correlated them to how many students are successfully tackling challenging AP coursework.

Since a questionnaire of this nature did not exist, the researcher developed a new instrument for this study (see Appendix D). The instrument used a Likert scale to measure participants' responses to the questionnaire items. Each statement had seven possible responses, with anchor points of strongly disagree and strongly agree. The questionnaire was arranged and analyzed in such a way that higher numerical values

indicated beliefs and perceptions that remove barriers to student participation in more rigorous courses and prepare students to be successful. Lower scores indicated a structure that reserves these courses for a select few of the brightest students or that don't provide complete preparation for a successful experience. The questionnaire items were arranged into six constructs based on the literature related to students having access to, and success in, AP coursework. Within each construct, questionnaire items were separated into "Your Personal Beliefs" and "Your School's Practices." For a detailed description of instrument construction, see Chapter II, "Research Construct Development" and Chapter III, "Instrument."

The questionnaire (see Appendix D) was sent to 88 principals of high schools affiliated with the Chicago Area Directors of Curriculum and Assessment (CADCA). Of the principals contacted, 64 returned the questionnaire and consent form for a return rate of 73%. Due to aberrant data for three schools, data from 61 schools were used for the final analysis. The Equity and Excellence Score for each school was obtained from the College Board in accordance with a license agreement between the researcher and the College Board (see Appendix G), ensuring confidentiality for each school involved in the study. Demographic data were collected from each school's 2009 Illinois School report card at the following website: http://iirc.niu.edu/. These data included the low-income rate and a combined percentage of minority students. The percentage of minority students was derived by adding the percentages of African American, Hispanic, and Native American students. These student groups are often considered to be at-risk racioethnic groups (Adelman, 2006; Cordogan, 2006; Klopfenstein, 2004).

Conclusions

Demographic Data

The data collection and analysis yielded results that were both statistically significant and educationally meaningful. First, the demographic variables of low-income and minority students were significantly related to the AP Equity and Excellence Score. As the percentage of low-income and minority students increased, the Equity and Excellence Score decreased, indicating less students successfully completing AP coursework during their high school career. These results are consistent with the findings of many researchers (Adelman, 2006; Cordogan, 2006; Klopfenstein, 2004).

However, when comparing demographically-similar schools, it is clear that demographics alone do not predict the variability in the Equity and Excellence Score. The data revealed a wide range of Equity and Excellence Scores among schools serving populations that were nearly identical on demographic variables, especially among schools with a very small minority population. Further, very similar Equity and Excellence Scores were seen in schools serving a wide range of minority populations. These results indicate the need to probe deeper into the beliefs and practices of these schools. Student demographics are a factor in the percentage of students having a successful AP experience, but do fully explain the differences between schools.

Relationships between demographic data and students' achievement should not be used to make excuses for why students are not successfully completing AP coursework, but rather to make action plans to allow more students to succeed. Some students enter high school with academic skills that lag behind their peers. More importantly, many

bring with them the belief that they are not able to succeed in school, and with parents who are either unwilling or ill equipped to provide the support and advocacy they need (Ferguson, 2007; Lucas, 1999; Oakes, 2005; National Study Group for the Affirmative Development of Academic Ability, 2004; Steptoe, 2004). While the current study focused on success in AP coursework, students will only be prepared to tackle these courses when the skills leading to AP courses have been developed. Attewell and Thurston (2008) noted the ongoing tradition of lower expectations for some students, and how this leads to a subtle form of discrimination. Researchers have indicated the learning gains when diverse student populations are given access to rigorous coursework (ACT and the Education Trust, 2005; Barth & Haycock, 2004; Bottoms, 2003; Burris & Garrity, 2008; Chenoweth, 2007; Garrity, 2004; The Education Trust, 2005). The literature also reveals schools that have taken action to successfully expand access to AP coursework for students of all backgrounds (Associated Press, 2008; Cech, 2008b; College Board, 2002; Grier, 2002; Singer-Vine, 2008; Turque 2008a).

All students need school policies and school leaders that will advocate for them; this is especially true for students who are underrepresented in rigorous courses. These underrepresented student groups and their parents are often the unheard voices in schools. The data collected for Item 2 on the questionnaire revealed an overwhelmingly strong agreement with the statement "If my child attended our high school, I would want him or her to take at least one AP course." Certainly, these principals would advocate for their own children, and they must provide the leadership and policies that will advocate for <u>all</u> of their students. John Dewey (1991) highlighted the need for schools to advocate for

their students when he said, “What the best and wisest parent wants for his own child, that must the community want for all of its children.”

Research Constructs

The research data were analyzed using multiple regression analysis. While the regression model was significant with the demographic variables, it was also significant when the six Belief Scales and the six Practices Scales were added to the regression model. In addition, the data indicated research constructs that were the most strongly related to the Equity and Excellence Score. First, the Practices Scale for “General Course Offerings” was significantly correlated to the AP Equity and Excellence Score. This construct included items related to non-AP courses, vertical articulation between courses, and having AP teachers also teach non-AP courses. For example, Item 15 from this construct (“Our school has worked to eliminate low-level courses”) had a significant partial correlation to the Equity and Excellence Score. These results suggest that schools that offer rigorous (and less low-level) courses to all students throughout their high school careers are more likely to have more students participating in a successful AP experience.

Since students typically take AP coursework during their junior and senior years, the academic placement and course selection in earlier high school years plays a role in which students will be ready to take AP courses. The literature contains multiple studies dealing with student placement in American high schools, including the widespread use of tracking, the ways in which students are placed into courses, and the need for educators to be aware of the effects on students (George & Rubin, 1992; Hallinan, 1994;

Jackson 2008; Lucas 1999; Oakes, 2005; Oakes, 1995; Oakes & Guiton, 1990; Westchester Institute, 2002). Unfortunately, when students are placed into lower-level tracks, they are often constrained to less challenging tasks, causing them to grow more slowly in their academic skills (Ashwill et al., 1999; Lucas, 1999; Lucas & Berends, 2002; Oakes, 2005; Turque, 2008b; Westchester Institute, 2002). These students often do not experience the necessary rigor in their non-AP courses to build the skills and knowledge to be successful in AP or college coursework. The course placement practices in schools reflect the degree to which educators believe students can learn and achieve, the essence of which is captured in the following quote from Charles Eliot (1969), President of Harvard University, over 100 years ago:

> It is a curious fact that we Americans habitually underestimate the capacity of pupils at almost every stage of education from the primary school through the university…It seems to me probable that the proportion of grammar school children incapable of pursuing geometry, algebra, and a foreign language would turn out to be much smaller than we now imagine (pp. 260-261).

Researchers widely agree that schools must provide access to rigorous courses for all students, citing outstanding results when this occurs (ACT and the Education Trust, 2005; Burris & Garrity, 2008; Chenoweth, 2007; Futrell & Gomez, 2008; Garrity, 2004; Hallinan, 2004; Haycock, 2001; Rodrigues, 2004). Barth and Haycock (2004) found that, regardless of ability level, students learn more in college-prep courses, are more likely to pass high-level than low-level courses, and are more likely to find and maintain a job after taking a college-prep curriculum.

In its 2002 report, "Opening Doors: Strategies for Expanding Access to AP," the College Board noted that successful schools align curriculum vertically between grade

levels, preparing more students to eventually tackle an AP course. The National Research Council (2002) made similar recommendations in their review of advanced (AP and IB) mathematics and science coursework.

A second significant research construct was the Belief Scale for "AP Placement Policies—Open vs. Limited Access." Questionnaire items in this construct referred to principals' beliefs about the type of students who should enroll in AP courses; the role of hard work versus high aptitude; and the role of grades, pre-requisite courses, and teacher recommendations in AP enrollment. This construct was significantly correlated to the Equity and Excellence Score, as well as having a significant impact on the regression model over and above the demographic variables. These results suggest that schools with principals whose beliefs indicate there should be more open access to AP courses for all students tended to have a higher Equity and Excellence Score.

School policies play a role in which students are allowed to take AP coursework. Attewell (2001) found that students in highly-acclaimed high schools were often less likely to take AP courses than students with comparable standardized test scores at less prestigious high schools, likely due to school leaders' fear that expanding participation in AP courses would lead to an unacceptable drop in scores. As a result, some schools hold students back, advising their second-tier students to take less rigorous courses and reserving AP courses for students who will be most likely to score very well on the AP exams.

Gatekeepers are often used to regulate AP enrollment, such as high test scores, grades in previous courses, teacher recommendations, and waivers from parents if

students don't meet the prerequisites, indicating the school will not be responsible if the student struggles (National Research Council, 2002). The College Board (2002) noted that many schools have successfully expanded access to AP courses by eliminating pre-requisite courses and removing gatekeepers. Describing one district's initiatives to expand access to its AP program, Grier (2002) outlined several district-wide measures, including no longer requiring students to have letters of recommendation or GPA requirements to enroll. More recently, The Education Commission of the States (2008) highlighted actions taken by 13 states to encourage greater student access to AP courses.

A third construct with interesting results was that of "Attracting More Students to AP Courses." This construct was not significantly related to the Equity and Excellence Score. In fact, items in the Practices Scale for this construct had the lowest mean scores of all research constructs. Of most interest, schools in this study are generally not using tangible incentives to attract more students to take AP courses and take the AP exams as has been seen in other parts of the country (Associated Press, 2008; Education Commission of the States, 2008; Singer-Vine, 2008; Turque, 2008a; U. S. Department of Education Office for Civil Rights, 2004).

However, two questionnaire items for the "Attracting More Students" Belief Scale were significantly correlated to the Equity and Excellence Score, and had a significant impact on the regression model over and above the demographic variables. These items were #31 ("I believe our school should prepare all of our students for college") and #32 ("If we significantly increased the number of students in AP courses, I believe AP scores would suffer significantly"). These results indicate that schools tended

to have a higher Equity and Excellence Score if the principal believed their school should prepare all of their students for college, and did not feel AP scores would suffer significantly if they increased the number of students in AP courses.

A fourth and final construct to note was the "Expecting and Ensuring Success" Practices Scale. While the data did not meet the level of significance, this construct approached statistical significance in changing the regression model over and above the demographic variables. In addition, it had the highest partial correlation coefficient for any of the Practices Scales. This construct contained questionnaire items dealing with support structures outside the classroom, expectations for taking the AP Exam, use of data to make instructional improvements, and professional development opportunities for teachers and administrators. These results indicate that schools are more likely to have a higher Equity and Excellence Score if they expect success and have practices in place to ensure success once students enroll in an AP course.

Among the recommendations in its 2002 report, the College Board highlighted the importance of providing special study sessions for students and providing ongoing professional development for teachers. Researchers have documented that more students can tackle a rigorous curriculum when schools expect success and put systems in place to support both teachers and students (ACT & The Education Trust, 2005; Chenoweth, 2007; Grier, 2002). Schools must be aware that there are disparities in home structure for at-risk minority students compared to white and Asian students. These differences should not be used as an excuse for why schools can't educate all students, but rather to

understand the additional support necessary for some students to excel (Ferguson, 2007; Steptoe, 2004).

Teacher professional development is also essential to success. In its 4th Annual AP Report to the Nation (2008a), the College Board highlighted 20 states that have taken measures to facilitate and fund professional development activities for teachers of both AP and pre-AP courses. Paek et al. (2007) analyzed the relationship between teacher practices and student success on AP exams, citing the importance of professional development and an emphasis on higher-order thinking skills.

It is important to note that, although the Belief Scale and Practices Scale in the other research constructs were not statistically significant, this does not mean that they are not important or related to students' success in AP coursework. These statistics simply indicate that the total scores in these constructs do not explain the variability between schools. This could be accounted for in many ways, including the fact that many principals may have similar beliefs, have not had time in their tenure as principal to implement practices aligned with these beliefs, or that these changes have not yet impacted AP enrollment and success.

Implications for Educational Leadership and Policy Implementation

Other authors have indicated the need for an effort-based belief system, implying that with hard work and determination, students can reach goals previously believed to be unattainable (Dweck, 2006; Westerberg, 2009). Dweck refers to the "fixed" mindset and the "growth" mindset. The fixed mindset believes each person is born with a certain amount of intelligence that does not change. However, the growth mindset believes that

human qualities such as intelligence can be cultivated, and that our true potential will only be realized through persistence and hard work. It is unfortunate when students have the fixed mindset, leading to avoiding the hard work that will allow them to grow as learners. However, it is tragic when educators have these fixed mindset beliefs about their students. If educators believe that only certain students can handle the most challenging courses, and only allow that handful to enroll, the result will be continuing to offer general and remedial courses to some students, and preventing growing numbers of students to pursue the most academically-challenging courses such as AP coursework.

It is for these reasons that schools must continue to seek ways to remove barriers to students' engaging in a rigorous curriculum. General, remedial, or low-level courses are often believed to be necessary to meet the learning needs of students. However, this sends the message that these students are not capable of learning concepts and content that will prepare them for AP coursework or college. This research demonstrated a clear relationship between schools working to eliminate low-level courses and ensuring their non-AP courses lay a foundation of academic rigor, and the percentage of students successfully completing AP courses in high school. These practices support the findings and recommendations of other researchers and authors, who have indicated that students are more successful when educators believe they can succeed, and put the support systems in place to ensure success. (ACT & The Education Trust, 2005; Burris & Garrity, 2008; Chenoweth, 2007; Garrity, 2004; Grier, 2002; Hallinan, 2004; Haycock, 2001; Westerberg, 2009). Many schools have put these systems in place, both in schools included in this study as well as across the United States (Burris & Garrity, 2008;

Chenoweth, 2007; Futrell & Gomez, 2008; Garrity, 2004; Grier, 2002; McNeil, 2007; Riley, 2006; Rodrigues, 2004; Westerberg, 2009).

Unfortunately, the connection between high expectations and high achievement for students is not new. Over 40 years ago, Rosenthal and Jacobson (1968) published their landmark work "Pygmalion in the Classroom" which showed that when students were expected to learn and grow more at exceptional rates, they did learn and grow at exceptional rates. There exists a vast body of research on teacher expectations and self-fulfilling prophecy, which has shown the variety of ways in which educators form student expectations, how they express these expectations to their students, how the teachers' practices change, and the resultant effects on student learning (Brophy 1983; Good, 1987). These beliefs and values shape the practices of our schools. Our beliefs about what students can learn and do drive student placement policies, as well as the expectations of students in rigorous courses.

In a 2005 speech, Bill Gates referred to the moral obligation educators have to minority students in rigorous courses. The same argument can be made for any student, and the responsibility schools have to provide access to the most challenging courses:

> Once we realize that we are keeping low-income and minority kids out of rigorous courses, there can be only two arguments for keeping it that way– either we think they can't learn, or we think they're not worth teaching. The first argument is factually wrong; the second is morally wrong (Gates, 2005).

If research is clear that high expectations lead to high achievement, there appears to be a "knowing-doing" gap, since not all schools have implemented practices to the same extent. This is the contention made by Pfeffer and Sutton (2000) after investigating

excellent companies and their ability to close the "knowing-doing" gap. There are virtually no "secrets" to success. The challenge is taking an organization from knowing the best practices to actually implementing them. This implementation occurs when the leader's vision is shared with the entire organization, the knowledge and vision are engrained in the culture of the organization, and the vision is reinforced and carried out by all members of the organization. Pfeffer and Sutton suggest that for everyone in the organization to take action, the leader must drive out the fear of failure. Leaders must encourage action, and provide support for the initiatives that support the vision. In addition, monitoring and tracking progress must be done at each step of the way. For a school's expanding AP program, this would include not only monitoring the Equity and Excellence Score, but other indicators such as the percentage of students succeeding in courses leading to AP courses. These indicators can provide leaders insight about students who need additional support or students who could be accelerated into more rigorous courses.

Many schools offer rigorous AP coursework. The scores will remain high if there are stringent selection criteria on who is allowed to take the courses. Although AP programs are the not the only goal of high schools, they are one way to measure the degree to which schools are providing a rigorous academic curriculum, and the extent to which these courses are available to all students. In addition, they provide an external benchmark against which student learning can be compared on a national scale.

A framework of equity and social justice demands that we investigate options to maximize learning for all students. If we truly believe all students can learn, educational

leaders must explore ways to allow them to stretch and grow to their fullest potential, and identify any attitudes or practices that block opportunities. Providing students with a path to taking AP courses also gives students a chance to receive college credit without paying college tuition, a significant value for students from lower socioeconomic backgrounds.

Administrators set policies for their schools, but these policies must be rooted in research on what works best for students, and the efficacy and equity of the policies. This research examined the principals' personal beliefs and perceptions of school practices. The findings of this study can help school leaders formulate or re-examine policies that will ensure success for each and every student.

School leaders have a responsibility to establish a vision for their schools, shaping the principles that guide policy decisions. School leaders are faced with an important decision: Will we consign some students to a lesser curriculum, allowing them to fall farther behind their peers, or will we equip all students with the skills they need to tackle rigorous courses, ameliorating some of the current disparities. Many leaders profess that all students can learn. Moral leadership serves these values and ideals, believing not only that all students can learn, but also that all students must learn. By coming to a more complete understanding of the relationship between leaders' personal beliefs and student success, this study contributes to the literature about the ways leaders provide opportunities for all students to learn to their full potential.

Recommendations for Future Research

1. A replication of this study should be conducted with schools not in the suburbs of a major metropolitan city. This would illuminate differences in beliefs and practices with a more diverse sample of schools, providing a greater ability to generalize these findings to schools throughout the United States. Additional research with this research questionnaire (see Appendix D) would also provide more data regarding instrument reliability.
2. A replication study should specifically pair schools by their minority populations or by their Equity and Excellence Scores. This pairing could use different statistical tools to determine differences between the two groups of schools based upon questionnaire responses.
3. A similar study should be conducted examining students' beliefs about their ability to succeed in AP courses. This research should also investigate their motivation for challenging themselves in high school and factors leading to their course selections.
4. Future researchers should include in their sample other school leaders who are responsible for student placement and carrying out the AP program in schools. These may include AP coordinators, guidance counselors, department chairs, and teachers. Wilkins (2006) sampled teachers in her research, but a specific sampling of AP teachers could lend additional insight into the beliefs of all school leaders in the research constructs from the current study.

5. A case study is warranted to gain a more in-depth analysis of the school culture in a select group of schools. This research could include the use of interviews, observations, questionnaires, and artifact reviews (e.g., school course book, placement policies, pre-requisites for courses, sequencing of courses, percentage of students in Pre-AP Courses, etc.). Although the current study utilized a questionnaire to ascertain these data, it is quite possible that some principals may not be completely clear on the practices of their AP program. In addition, it is possible that the principal holds a set of beliefs and expectations, while other members of the school community do not have the same vision or have not worked to implement the vision. Principals may be overly optimistic about the degree to which particular placement practices are taking place. Principals may have worked to implement changes, but these changes may not yet be widespread. A case study would allow a thorough investigation into barriers that prevent students from taking advantage of AP courses in the school.
6. Several items on the questionnaire had greater variability in responses, and were highlighted in Tables 10, 11, 12, and 13 in Chapter IV. Further research should consider asking these same questions about beliefs and practices, and more closely probe the relationships to opportunities for students to pursue and succeed in both AP courses and the courses preparing students to take AP courses.

7. A case study should be completed with schools that have strategically and methodically expanded access to AP courses. Longitudinal data collection could monitor how changes have resulted in more access for students, and the impact on passing rates. This approach would somewhat overcome the challenge of the short principal tenure seen in some schools (see Table 2). Changes in beliefs and practices over time could be analyzed. Beliefs and practices are related, but it is not always clear which comes first. Do beliefs about students' ability drive the practices schools implement, or do beliefs follow implementation of practices and certain behaviors (Foord, 2008; Pfeffer & Sutton, 2000)?
8. Additional research is warranted to determine steps schools have taken to make high achievement "cool" with students, especially among minority students (Ferguson, 2007; Steptoe, 2004).

Summary

This chapter presented an overview of the rationale for this study, as well as the data collection and analysis procedures. Conclusions from the research were reviewed including the research constructs which were significantly related to more students having a successful AP experience. In addition, the implications of this research for school leaders wishing to provide opportunities to more students were highlighted. Finally several suggestions were proposed for areas of future research.

APPENDIX A

VOICEMAIL SCRIPT FOR INITIAL RESEARCH PARTICIPANT CONTACT

Hi _____(principal's name)_____. My name is Steve Wood. I am a doctoral student at Loyola University Chicago, and I am conducting my dissertation research with the help of school principals belonging to the Chicago Area Directors of Curriculum and Assessment. Because of your school's participation with CADCA, I am calling to personally invite you to participate in this study. In the next couple of days, you will receive an email from me, which contains more information regarding my research study. I truly appreciate your help as I conduct this research. Thank you very much.

APPENDIX B

INFORMATIONAL EMAIL TO RESEARCH PARTICIPANTS

Dear

My name is Steve Wood. I am currently completing my Ph.D. in Administration and Supervision at Loyola University Chicago. My dissertation is entitled "Student Access to Advanced Placement Coursework: Principals' Beliefs and Practices."

The purpose of my research is to examine the relationship between principals' beliefs and perceptions of school practices, and the opportunities for students to successfully complete rigorous Advanced Placement coursework. You are being asked to participate in this research because of you school's membership in the Chicago Area Directors of Curriculum and Assessment (CADCA) and your school's Advanced Placement program.

Your participation in this research will require approximately 15-20 minutes of your time. You will be asked to complete a questionnaire regarding your personal beliefs and perceptions of school practices in six research constructs.

Please understand that I will keep all information and school data strictly confidential. I will have sole access to the information, and your school will not be identified by name. Questionnaire data will be used only for drawing correlations and performing multiple regression data analysis.

I truly value your time, and am sensitive to the many demands on your time and requests for research participation. Your school has much to offer to this project, and I greatly appreciate your consideration in helping me complete my research. In return for your participation, I will provide you with a summary of my research findings if you desire.

Please understand that your participation in this research is completely voluntary. There is no penalty for choosing not to participate. In addition, you are free to withdraw from participation at any time, for any reason, with no penalties whatsoever.

Within the next week, I will mail a copy of the questionnaire to you. In the meantime, if you have any questions, you can contact me at (847) 415-4447 or swood@luc.edu. If you have any questions regarding this research study as part of my Ph.D. program at Loyola University, you can contact Dr. Janis Fine, Graduate Program Director, Administration and Supervision at jfine@luc.edu.

Thank you for your consideration of this request. I look forward to learning from you and your school.

Sincerely,
Steve Wood
Loyola University Chicago

APPENDIX C

CONSENT TO PARTICIPATE IN RESEARCH

To:

From: Steve Wood

Date: Fall, 2009

Re: Consent to participate in research

Project Title: Student Access to Advanced Placement Coursework: Principals' Beliefs and Practices

Researcher: Steve Wood

Faculty Sponsor: Dr. Janis Fine, Administration and Supervision Program
Loyola University Chicago

You are being asked to take part in a research study conducted by Steve Wood for a dissertation project under the supervision of Dr. Janis Fine at Loyola University Chicago.

You are being asked to participate because of you school's affiliation with the Chicago Area Directors of Curriculum and Assessment (CADCA) and your school's Advanced Placement program.

Please read this form carefully and ask any questions of the researcher before agreeing to participate. You may contact the researcher at (847) 415-4447 or swood@luc.edu.

Purpose:
This purpose of this research is to explore the relationship between principals' beliefs and perceptions of school practices, and the opportunities for students to successfully complete rigorous Advanced Placement coursework.

Procedure:
Your participation in this research will require approximately 20 minutes of your time. If you agree to participate in this study, you will be asked to complete and return the enclosed questionnaire regarding your personal beliefs and perceptions of school practices in six research constructs.

Risks/Benefits:
There are no foreseeable risks involved in participating in this research beyond those experienced in everyday life. There are no direct benefits to you from participation, but the results will help school leaders understand beliefs and practices related to expanding student access to rigorous coursework.

Confidentiality:
Only the researcher will have access to the raw data. The identity of all respondents will be kept strictly confidential. No identifying information for participants or their schools will be presented in the results of the study. Data from the schools will be aggregated, with no discernible connections included between the school and the research data. Any necessary references to individual schools or groups of schools will be done using a pseudonym for the school. The consent forms and questionnaires will be stored in two different locked file cabinets in the researcher's office. These forms will be destroyed one year following the final defense and approval of the dissertation.

Voluntary Participation:
Please understand that your participation in this research is completely voluntary. There is no penalty for deciding not to participate. In addition, you are free to withdraw from participation at any time, for any reason, with no penalties whatsoever.

Contacts and Questions:
If you have any questions about this research study, please feel free to contact Steve Wood at swood@luc.edu or (847) 415-4447. You may also contact Dr. Janis Fine at jfine@luc.edu. If you have questions regarding your rights as a research participant, you may contact the Compliance Manager in Loyola's Office of Research Services at (773) 508-2689.

Statement of Consent:
Your signature below indicates that you have read and understood the information provided above, have had an opportunity to ask questions, and agree to participate in this research study.

_____ _____
Participant's Signature Date

Please return this consent form with your questionnaire in the enclosed, pre-addressed envelope.

APPENDIX D

PRINCIPALS' BELIEFS AND PERCEPTIONS OF SCHOOL PRACTICE ABOUT AP COURSEWORK AND STUDENT PLACEMENT

Principals' Beliefs and Perceptions of School Practice About AP Coursework and Student Placement

Instructions: Please rate the degree to which "Your Personal Beliefs" and "Your School's Practices" are reflected by each of the following statements. Place a check mark along the continuum from Strongly Disagree to Strongly Agree.

Value of AP Coursework & Communicating that Value to Stakeholders

Your Personal Beliefs

1. I believe that students who plan to attend college should participate in at least one AP course.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

2. Students benefit from the AP experience, even if they don't achieve a qualifying score on the AP exam (3, 4, or 5).
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

3. Students who earn qualifying scores on AP exams (3, 4, or 5) are prepared for college coursework.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

4. I believe our school should have specific, measurable goals about AP participation and success.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

5. If my child attended our high school, I would want him or her to take at least one AP course.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Your School's Practices

6. Our school has specific, measurable goals about AP participation as part of our mission, vision, and/or school values statement.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

7. Our school effectively communicates our AP participation goals to our school's faculty.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

8. Our school has taken proactive measures to effectively communicate the opportunities and expectations of our AP program to parents and students.
   Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

9. Our students know the high school course sequence they need to prepare for AP classes.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

10. Our counselors proactively communicate the value of participating in AP courses to all students.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

General Course Offerings

Your Personal Beliefs

11. In my opinion, low-level courses are necessary to accommodate the needs of our students.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

12. I believe low-level courses are necessary to provide our students a sense of success.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

13. I believe a college preparatory sequence should be the minimum standard academic program for our students.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

14. I believe an AP teacher's course load should include teaching both AP and non-AP courses.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Your School's Practices

15. Our school has worked to eliminate low-level courses.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

16. Our school's non-AP courses lay a foundation of academic rigor that will prepare students to succeed in AP coursework.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

17. Our school has developed a vertically-aligned curriculum to prepare students for AP coursework.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

18. Our typical course sequence includes students' taking an AP course.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

19. Our AP teachers also teach non-AP courses.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

AP Placement Policies—Open vs. Limited Access

Your Personal Beliefs

20. In my opinion, AP courses should be reserved for our best students.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

21. I think pre-requisite courses should play a large part in determining if a student is prepared to take an AP course (or courses leading to AP participation).
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

22. I believe that preparation to take an AP course should include an "A" average in that particular subject area.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

23. In my opinion, faculty recommendations should play a large part in determining if a student is placed in an AP course.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

24. I believe hard work is as important as high aptitude for a successful AP experience.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Your School's Practices

25. Our students are encouraged to try more challenging courses as they progress through high school.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

26. Our school has promoted specific AP courses that would allow greater numbers of students a successful initial experience with an AP course.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

27. We allow students and their parents to ultimately decide if they are prepared to take an AP course.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

28. We encourage students to take an AP class early in their high school career.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Attracting More Students to AP Courses

Your Personal Beliefs

29. I think our school should actively explore options to increase participation in AP courses.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

30. I believe there are significantly more students in our school who could be successful in AP courses than are currently enrolled.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

31. I believe our school should prepare <u>all</u> of our students for college.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

32. If we significantly increased the number of students in AP courses, I believe AP scores would suffer significantly.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

33. I think our school's leaders would accept an initial drop in AP scores if it corresponded with a larger AP enrollment.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

34. I think our school should actively recruit and encourage students from underrepresented populations to take AP courses.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

<u>Your School's Practices</u>

35. We have strategies in place to identify more students who could successfully complete an AP course.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

36. Our school uses federal funds and/or College Board AP Fee Reduction to allow students from low-income families to take AP exams at a reduced cost.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

37. Our students receive tangible incentives if they take an AP course and the AP exam.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

38. Our school closely monitors the percentage of students who have a successful AP experience (e.g. College Board's Equity and Excellence Score).
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Teachers' Adaptability & Commitment to AP Excellence & Expansion

<u>Your Personal Beliefs</u>

39. In my opinion, part of a teacher's role should be to encourage students to enroll in AP courses.
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

40. I believe AP teachers should use a variety of instructional approaches to accommodate different learning styles in our AP courses.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

41. I think teachers in our school consider teaching AP courses as more important than teaching other courses.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

42. I think our teachers would view increasing enrollment in AP as leading to "watering down" the AP curriculum.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Your School's Practices

43. Our teachers actively discuss ways to increase AP participation.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

44. Our teachers actively seek out students who may be candidates to take AP coursework.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

45. Our AP teachers routinely work together to share best-practices ideas.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

46. Our AP teachers offer intensive review sessions to prepare students for the AP exam.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Expecting and Ensuring Success for Students in AP Courses

Your Personal Beliefs

47. If a student enrolls in an AP course, I believe it is the school's responsibility to ensure he or she is successful.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

48. Our school community believes that if students enroll in an AP course, they will succeed in the AP course.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

49. I believe AP teachers should be given specific professional development opportunities to increase their effectiveness.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

50. I think administrators need ongoing professional development focused on creating and expanding a successful AP program.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Your School's Practices

51. Our school has excellent support structures outside of the classroom for students to be successful in AP courses.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

52. Our students are expected to take the AP exam if they enroll in an AP course.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

53. Our teachers utilize the Instructional Planning Report from the College Board to plan instructional improvements.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

54. Our teachers have been trained in the use of data to improve AP instruction.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

55. Our school encourages and pays for teachers to attend AP meetings or other AP training.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

56. Our school supports administrators' training by offering professional development in how to manage and grow our AP program.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

57. Including the current school year, how many years have you:

Worked in your current school? _____ years

Served as principal of your current school _____ years

Your School Name: _____School District #: _____

Please return this questionnaire with your signed consent form in the enclosed pre-addressed, stamped envelope by _____, 2009.

APPENDIX E

FOLLOW-UP EMAIL TO RESEARCH PARTICIPANTS

Fall, 2009

Principal
Name of School
Address
City, Illinois, Zip

Dear Principal,

Approximately one week ago, you received a request to participate in a dissertation research study I am conducting for my Ph.D. in Administration and Supervision at Loyola University Chicago. My dissertation is entitled Student Access to Advanced Placement Coursework: Principals' Beliefs and Practices.

You may have already completed the questionnaire and returned it to me. If so, thank you so much for providing information that will help school leaders better understand beliefs and practices related to students' opportunities to successfully complete rigorous coursework. If you have not yet had a chance to complete and return the questionnaire, I would truly appreciate your taking the time to do so.

Please understand that I will keep all information and school data strictly confidential. I will have sole access to the information, and your school will not be identified by name. Research data will be used only for performing statistical correlations and multiple regression data analysis.

If you have any questions, you can contact me at (847) 415-4447. If you have any questions regarding this research study as part of my Ph.D. program at Loyola University, you can contact Dr. Janis Fine, Graduate Program Director, Administration and Supervision at jfine@luc.edu.

Thank you for your help with my research!

Sincerely,
Steve Wood
Loyola University Chicago
swood@luc.edu

APPENDIX F

FOLLOW-UP MAILING TO NON-RESPONDING RESEARCH PARTICIPANTS

Fall, 2009

Principal
Name of School
Address
City, Illinois, Zip

Dear Principal,

Approximately three weeks ago, you received a request to participate in a dissertation research study I am conducting for my Ph.D. in Administration and Supervision at Loyola University Chicago. My dissertation is entitled Student Access to Advanced Placement Coursework: Principals' Beliefs and Practices.

If your desk is like mine, the questionnaire may have made its way to the bottom of a stack of papers. I am including a second copy of the consent form and questionnaire for your review. Would you please consider completing them and returning to me in the enclosed pre-addressed envelope? I truly appreciate your attention to this research request and taking the time to complete the questionnaire. (You may have already completed the questionnaire, and it is on the way back to me. If so, thank you so much for providing information that will help school leaders better understand beliefs and practices related to students' opportunities to successfully complete rigorous coursework.)

Please understand that I will keep all information and school data strictly confidential. I will have sole access to the information, and your school will not be identified by name. Research data will be used only for performing statistical correlations and multiple regression data analysis.

If you have any questions, you can contact me at (847) 415-4447. If you have any questions regarding this research study as part of my Ph.D. program at Loyola University, you can contact Dr. Janis Fine, Graduate Program Director, Administration and Supervision at jfine@luc.edu.

Thank you for your help with my research!

Sincerely,

Steve Wood
Loyola University Chicago
swood@luc.edu

APPENDIX G

LICENSE AGREEMENT WITH COLLEGE BOARD FOR EXCELLENCE AND EQUITY DATA

45 Columbus Avenue, New York, NY 10023-6992 T 212 713-8000 F 212 713-8255 www.collegeboard.com

September 3, 2009

Dr. Janis Fine
Graduate Program Director, Admin. and Supervision
School of Education
Loyola University Chicago
820 North Michigan Ave
Chicago, IL 60611

Steve Wood
Graduate Student
Loyola University Chicago
38520 N. Shagbark Lane
Wadsworth, IL 60083

This letter will serve as a license agreement (the "Agreement") between Loyola University Chicago, (the "Licensee,") and the College Board, (the "Licensor" or the "College Board") and will govern Licensee's use of the College Board data identified below (the "Data"). The College Board will be pleased to grant the Licensee a limited, nonexclusive, nontransferable, non-assignable license to use the Data for research purposes only through September 30, 2011 the expiration date of this Agreement, in accordance with the terms and conditions stated herein.

A.

1. Licensed Data: Equity and Excellence percentages based on 2009 Advanced Placement Program® (AP®) test data for 92 schools as listed in Appendix A.

2. License Grant: These Data are to be licensed for the sole purpose of doing dissertation research to determine relationships between principals' beliefs/perceptions of school practices about student access to AP coursework and students who achieve scores of 3 or better on AP exams.

3. License Fee: The license fee for the Data is $250 and will be waived by the Advanced Placement Program. The current waiver does not imply or guarantee future waivers.

4. Format of Data: The Data will be provided to you in the following format: MS-Excel via email.

B. To preserve the confidentiality of students, the College Board does not report performance summaries if the number of test takers is less than fifteen (15). Licensee agrees not to reveal or report any aggregate data if the number of students in a category is less than fifteen (15), or if the number of high schools or colleges and/or universities is less than fifteen (15).

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6. Licensee will forward to the College Board, (free of charge and within thirty (30) days of publication), a copy of any research report that incorporates the Data. Unless otherwise specified all reports should be sent to the attention of: Ms. Sherby Jean-Leger, Research and Development Department; 45 Columbus Ave, New York, NY 10023.

7. If any time during the term of this License Agreement, Licensee should breach any of the terms herein, Licensor may immediately terminate this Agreement.

8. This Agreement shall be interpreted and construed in accordance with the laws of the State of New York, without regard to the principles of conflicts of laws, and with the same force and effect as if fully executed and performed therein, and the laws of the United States of America.

9. Licensee will not use the Data for any purpose other than that specifically granted hereunder, without the express written consent of the College Board.

10. Licensee has read a copy of the College Board's *Guidelines for the Release of Data*, (available at www.collegeboard.com/dataguidelines), and agrees to abide fully thereby. In addition to the aforementioned guidelines for the release of data, LICENSEE SHALL NOT USE COLLEGE BOARD DATA TO COMPARE OR ALIGN COLLEGE BOARD PRODUCTS WITH THIRD PARTY DATA, PRODUCTS OR SERVICES WITHOUT THE EXPRESS WRITTEN CONSENT OF THE COLLEGE BOARD.

11. Licensee may not under any circumstances distribute, re-print, alter, sell, assign, edit, modify or create derivative works of any ancillary materials, including but not limited to, question and answer forms, without obtaining the prior written permission of the owner. Please send your request to: http://www.collegeboard.com/inquiry/cbpermit.html.

12. Licensee represents and warrants that it is empowered under applicable State laws to enter into and perform this Agreement and that it has caused this Agreement to be duly authorized, executed and delivered by and through a person with the authority to execute the Agreement on its behalf.

13. Licensee further represents and warrants that it will comply with any and all local, municipal, state, and federal laws, rules, and regulations applicable to the performance of its obligations under this Agreement, including any and all local, municipal, state, and federal laws, rules, and regulations relating to privacy.

14. Licensee shall indemnify and hold harmless the College Board, its Trustees, officers, employees and agents against any and all losses, liability, and damages (including reasonable attorneys' fees and costs imposed in any judgment or order) which may arise in connection with: (i) any claim or action against the College Board with respect to Licensee's breach of its obligations under this Agreement; and (ii) a breach of any of the representations and warranties made by Licensee herein.

EXCEPT AS EXPRESSLY PROVIDED HEREIN, THE DATA ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, AND THE COLLEGE BOARD EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES IN RESPECT THEREOF, WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IT IS AGREED THAT CERTAIN OBLIGATIONS OF THE LICENSEE UNDER THIS AGREEMENT, WHICH, BY THEIR NATURE WOULD CONTINUE BEYOND THE TERMINATION OR EXPIRATION OF THIS AGREEMENT, SHALL SURVIVE TERMINATION OR EXPIRATION OF THIS AGREEMENT. SUCH OBLIGATIONS INCLUDE, BY WAY OF ILLUSTRATION ONLY AND NOT LIMITATION, THOSE OBLIGATIONS TO MAINTAIN CONFIDENTIALITY OF THE DATA AND TO RECOGNIZE THE OWNERSHIP OF THE DATA.

This License Agreement, which includes all Appendices attached hereto, contains the entire agreement and understanding between the parties and supersedes all prior agreements or understandings, whether written or oral, relating to all or any part of the undertakings set forth in this Agreement. Any amendments or modifications to this License Agreement must be in writing, dated, and signed by the parties.

Please indicate your acceptance of all the terms and conditions in this Agreement by signing below and returning one original to the College Board at the following address:

Ms. Sherby Jean-Leger
Research and Development Department
The College Board
45 Columbus Avenue
New York, NY 10023

The Data will be provided to Licensee after this Agreement has been fully executed by all parties.

Sincerely,

By: _____ (Signature)

Name: Wayne Camara (Print Name)

Title: Vice President, Research & Development

Licensee hereby represents and warrants that he/she has read, understood and agrees to comply with all the terms and conditions stated above.

Dr. Janis Fine

By: _____, Ph.D.
(Signature)

Name: Janis Fine
(Print Name)

Title: associate professor

Date: 9/11/09

Steven Wood

By: _____
(Signature)

Name: Steve Wood
(Print Name)

Title: Graduate Student

Date: 9/8/09

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VITA

Steve Wood was born in Waterloo, Iowa on September 11, 1968. He lived most of his childhood years in Cedar Falls, Iowa, and graduated from Walnut Ridge Academy in 1987. Following high school, he attended Taylor University in Upland, Indiana, earning a B.S. in Biology Education in 1991. In 2000, he completed a Master's degree in Biology at Northeastern Illinois University in Chicago, Illinois.

Steve spent the first three and a half years of his professional career at Abbott Laboratories in Abbott Park, Illinois. Although he enjoyed the practical applications of his science education, he chose to leave Abbott Labs and pursue his passion for educating children. Steve began his teaching career in 1995 at Aptakisic Junior High School in Buffalo Grove, Illinois, where he taught physical science and coached basketball and track. For the past 14 years, Steve has been a member of the science faculty at Adlai E. Stevenson High School in Lincolnshire, Illinois, teaching a variety of biology, chemistry, and earth science courses. During this time, he also had the pleasure of coaching boys' basketball and girls' track. Currently, he serves as the Assistant Director of Science, and will become the Director of Science beginning in the 2010-2011 school year.

He currently lives in the suburbs of Chicago with his wife Karin and their children Carter, Julia, and Colton.

DISSERTATION APPROVAL SHEET

The Dissertation submitted by Steven M. Wood has been read and approved by the following committee:

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The final copies have been examined by the director of the Dissertation Committee and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the Dissertation is now given final approval by the committee with reference to content and form.

The Dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Date Director's Signature